Agricultural Economic Report No. 62

THE DOMESTIC TREE NUT INDUSTRIES

AN ECONOMIC APPRAISAL

UNITED STATES DEPARTMENT OF AGRICULTURE
ECONOMIC RESEARCH SERVICE
MARKETING ECONOMICS DIVISION

PREFACE

This report updates and supersedes Marketing Research Report 139,"Marketing Tree Nuts--Trends and Prospects." Factors affecting the marketing of the major domestic tree nuts are analyzed. The period covered in this report is from 1930 to 1963.

The report is based largely on secondary data collected from various sources in the U.S. Department of Agriculture. In addition, a survey was made of the major marketers of almonds, filberts, and walnuts in California and Oregon to determine their marketing practices and channels of distribution. Data were collected for the 1962-63 season. A comparable survey was made of pecan shellers and processors in 1961, when data were collected for the 1960-1961 season.

Other reports in this group are:

"The Pecan Shelling and Processing Industry--Practices, Problems, Prospects," by Jules V. Powell and Donn A. Reimund, Agr. Econ. Rpt. No. 15, Sept. 1962.

"Economic Aspects of Pecan Production and Marketing," by Robert C. McElroy and Jules V. Powell, Agr. Econ. Rpt. No. 41, Sept. 1963.

"The Pecan Nursery Industry--Structure and Economic Aspects," by Jules V. Powell, Agr. Econ. Rpt. No. 44, Oct. 1963.

The author is grateful to the many tree nut growers, marketers, and administrators who provided data for this report.

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Washington, D. C. November 1964

SUMMARY

U.S. tree nut industries receive little public attention because they are small relative to some of the major staple crop industries and because their products are often ignored luxury ingredients of our most delectable food products. This report brings together information concerning the production and marketing of our major domestic tree nuts--almonds, filberts, pecans, and walnuts.

The growth of the tree nut industries has been rapid since the early 1900's. From 1930 to 1963, almond production increased 389 percent, pecans about 400 percent, and walnuts 157 percent. Percentage increases in filbert production were greater, but filberts comprise a small part of the total. All of the almonds are produced in California; filberts are produced in Oregon and Washington; and walnuts are produced in California, Oregon, and Washington. Pecans are produced in 14 Southeastern and South-central States.

The marketing of almonds, filberts, and walnuts is regulated by Federal marketing agreements and orders. The marketing of pecans has not been regulated since the mid-1950's. Since 1950, the U.S. Department of Agriculture has spent approximately $9 million for the removal of tree nut surpluses. These purchases and diversion payments are authorized under Section 32, Public Law 320, 74th Congress, as amended. Only 3 such surplus removal programs have been required since 1953.

Almonds, filberts, and walnuts are also produced in other countries, principally those bordering the Mediterranean. Pecans are produced only in the United States and Mexico. U.S. imports of tree nuts have increased, but all of the increase has been in kinds of nuts that are not produced here--principally cashews and brazil nuts. Imports of kinds of nuts produced domestically have declined.

Production of almonds and pecans is expected to increase rapidly in the next decade. Some increase in walnut production also is expected. Due to high costs of production, a relatively low tariff rate on imports, and a severe windstorm in 1962, filbert production is not expected to increase greatly over present levels.

There are more than 150 firms engaged in the procurement, shelling, and marketing of tree nuts. About 80 of these firms are engaged in marketing pecans; the remainder market almonds, filberts, and walnuts. The marketing of almonds and in-shell walnuts is dominated in each case by a large cooperative. Independent firms market most of the filberts and pecans.

Candy manufacturers are the main outlet for shelled almonds; salters use most of the filberts; and most of the shelled pecans and walnuts are used by bakers and for home consumption. As a whole, confectioners are the most important outlet for shelled domestic tree nuts, using approximately 28 percent of the total. Nearly all of the in-shell tree nuts are sold to households as mixtures or straight-packs during the winter months and particularly for the Thanksgiving-Christmas season.

Current consumption of tree nuts is small, compared with consumption of peanuts. During 1958-62, an average of 988 million pounds of shelled peanuts was used annually. During the same period, consumption of all domestic kinds of tree nuts averaged 138 million pounds, on a shelled basis. Peanuts predominate in salted nut mixtures and in candy. Tree nuts predominate in the bakery and ice cream manufacturing industries. Due to differences in costs of production, tree nuts do not compete with peanuts on a price basis.

THE DOMESTIC TREE NUT INDUSTRIES--AN ECONOMIC APPRAISAL

By Jules V. Powell, Agricultural Economist
Marketing Economics Division
Economic Research Service

INTRODUCTION

Tree nuts have been grown and consumed in the United States since colonial times, but the production of almonds, filberts, pecans, and walnuts on a commercial basis is a relatively new agricultural enterprise. Aided by favorable growing conditions and a ready market, the tree nut industries have expanded rapidly, and during the past 30 years total production has nearly tripled. Since the early 1930's, the United States has produced more tree nuts than it has imported.

The rapid expansion of the tree nut industries has been marked by wide fluctuations in the quantities of the various kinds of nuts produced, with resulting marketing problems for growers and marketing organizations. This publication brings together tree nut marketing information in a form which should be useful to growers and marketers in assessing the prospects for the industry and the role which they will play in it.

SUPPLY

Total supplies of tree nuts for domestic consumption are comprised of U.S. production plus imports. In recent years, domestic production has accounted for approximately 60 percent and imports about 40 percent of domestic supplies.

Domestic Production

Commercial production of edible tree nuts in the United States has trended upward since 1929. In 1963, a record crop of nearly 332,000 tons of nuts was produced. the 1929-33 average was 85,275 tons. The record 1963 crop includes, of course, the largest pecan crop in history. However, the domestic tree nut crop averaged 245,691 tons during 1959-63.

Pecans and walnuts are the largest domestic tree nut crops. In the late 1940's and early 1950's more walnuts were produced than pecans, but more pecans have been produced since the mid-1950's. Almonds have become increasingly important also, and now comprise nearly 20 percent of total domestic tree nut supplies, compared with about 15 percent in the 1930's (fig. 1).

Commercial acreages of almonds, filberts, and walnuts are located in California, Oregon, and Washington. Pecans are grown in 14 Southeastern and South

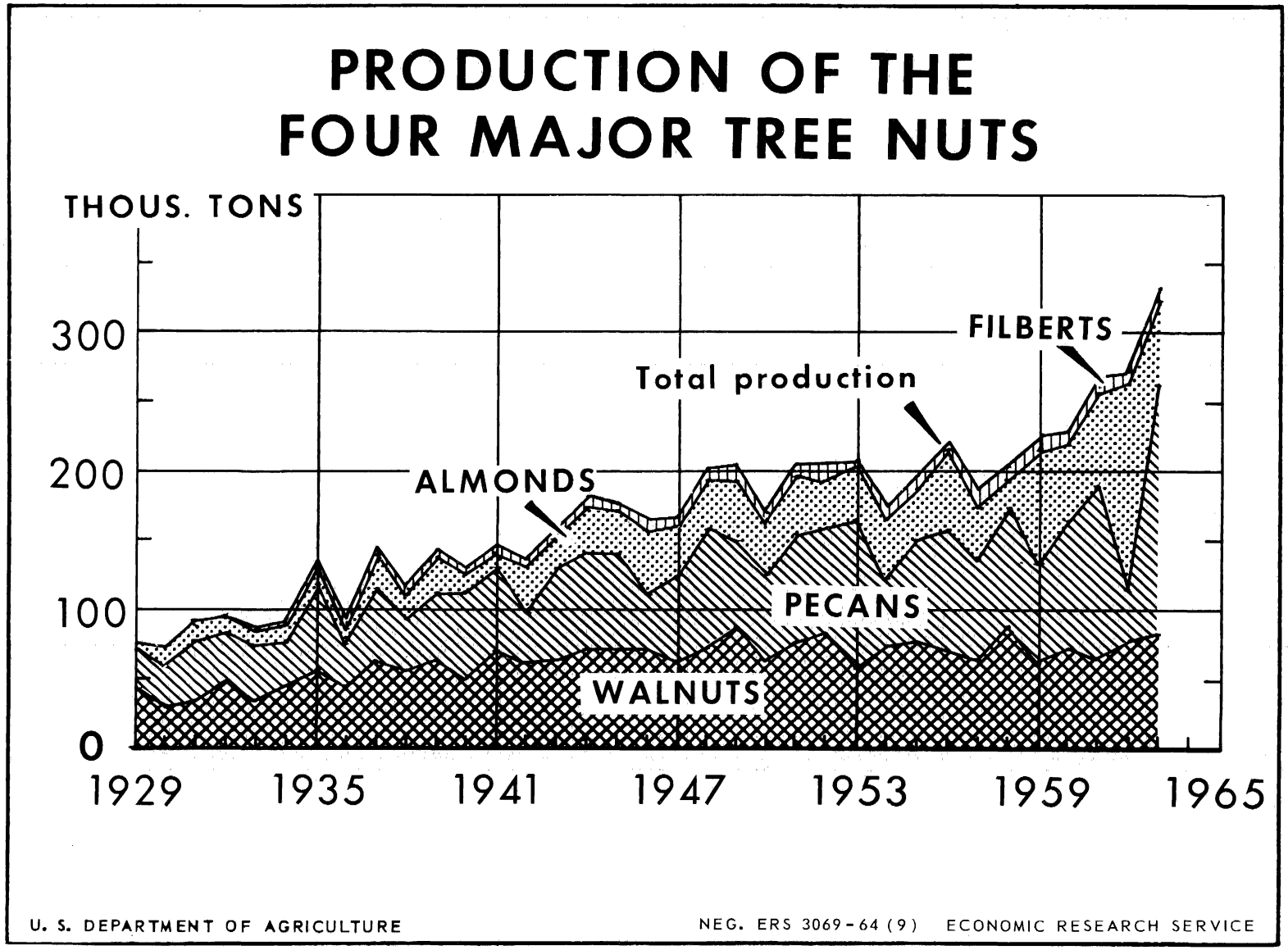
PRODUCTION OF THE
FOUR MAJOR TREE NUTS
THOUS. TONS
300
200
100
0
1929
1935
1941
1947
1953
1959
1965
FILBERTS
Total production
ALMONDS
PECANS
WALNUTS
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 3069-64 (9) ECONOMIC RESEARCH SERVICE

Figure 1

central States, ranging from North Carolina on the east to New Mexico on the west and northward into southern portions of Missouri and Illinois.

Practically all of the commercial acreage of almonds is in California, principally in a central belt about 700 miles long. Between 1929 and 1962, total commercial acreage of almonds increased approximately 54 percent. An output increase of 347 percent--from 13,500 tons in 1930 to 60,300 in 1963--was accompanied by an increase in bearing acreage of only about 35 percent. Due to annual fluctuations in yields, comparisons of 2 years may be misleading. However, when 1929-33 average production is compared with 1959-63 production, the results are startling. Production increased 418 percent between the 2 periods (fig. 2).

Almost 90 percent of the acreage used for producing filberts is in Oregon, with most of the plantings in the Willamette Valley. The remaining acreage is located in the southwestern section of Washington. Commercial production of filberts is the newest domestic nut crop enterprise, and percentage increases in acreage and production have been larger than for other nuts. Production of filberts is still a relatively small portion of the total. Acreages of filberts rose from 2,000 acres in Oregon and 300 acres in Washington in 1929 to 23,000 and 3,000 acres, respectively, in the mid 1950's and declined to 17,734 and 813 acres in 1963. Total acreage has been reduced in recent years, due partially to a severe windstorm in 1962 which uprooted thousands of trees. Filbert production was less than average in 1962 and 1963, but the 1959-63 average was 12 percent greater than the 1949-53 average (fig. 3).

More than 90 percent of the domestic walnut acreage is in California. In recent years, the center of walnut production has moved from southern California north to the San Joaquin and Sacramento Valleys and to the coastal valleys both north and south of San Francisco. Most of the remaining domestic walnut acreage is found in the Willamette Valley of Oregon, but some walnuts are produced commercially in southwestern Washington. Total acreage of bearing walnut trees rose from 107,400 acres in 1929 to 136,000 acres in 1963. Walnut-bearing acreage in California increased from 97,600 acres in 1929 to 126,200 acres. Similar data for Oregon indicate an increase from 9,800 in 1929 to 12,561 bearing and nonbearing acres in 1963. In the late 1940's and early 1950's, Oregon had nearly 28,000 acres of bearing walnut trees. The production of walnuts increased from 43,400 tons in 1929 to 83,100 in 1963, approximately 92 percent (fig. 4). California production usually comprises about 90 to 95 percent of the total domestic supply. In 1963, 79,200 of the 82,250 tons produced came from California. Oregon walnut production was severely curtailed by damage to the trees by the freeze in 1955 and by the wind in 1962.

Pecans may be grown in widely scattered areas of the United States, but those entering commercial channels are usually harvested in the Southeastern and South-Central States (fig. 5). There are no accurate data on total acres of pecan trees, because many of them are wild trees that have volunteered along streams and on broad alluvial plains throughout the South. Production figures tend to be more a reflection of prices rather than acres of trees, because large quantities of the wild or seedling pecans may not be harvested, if the

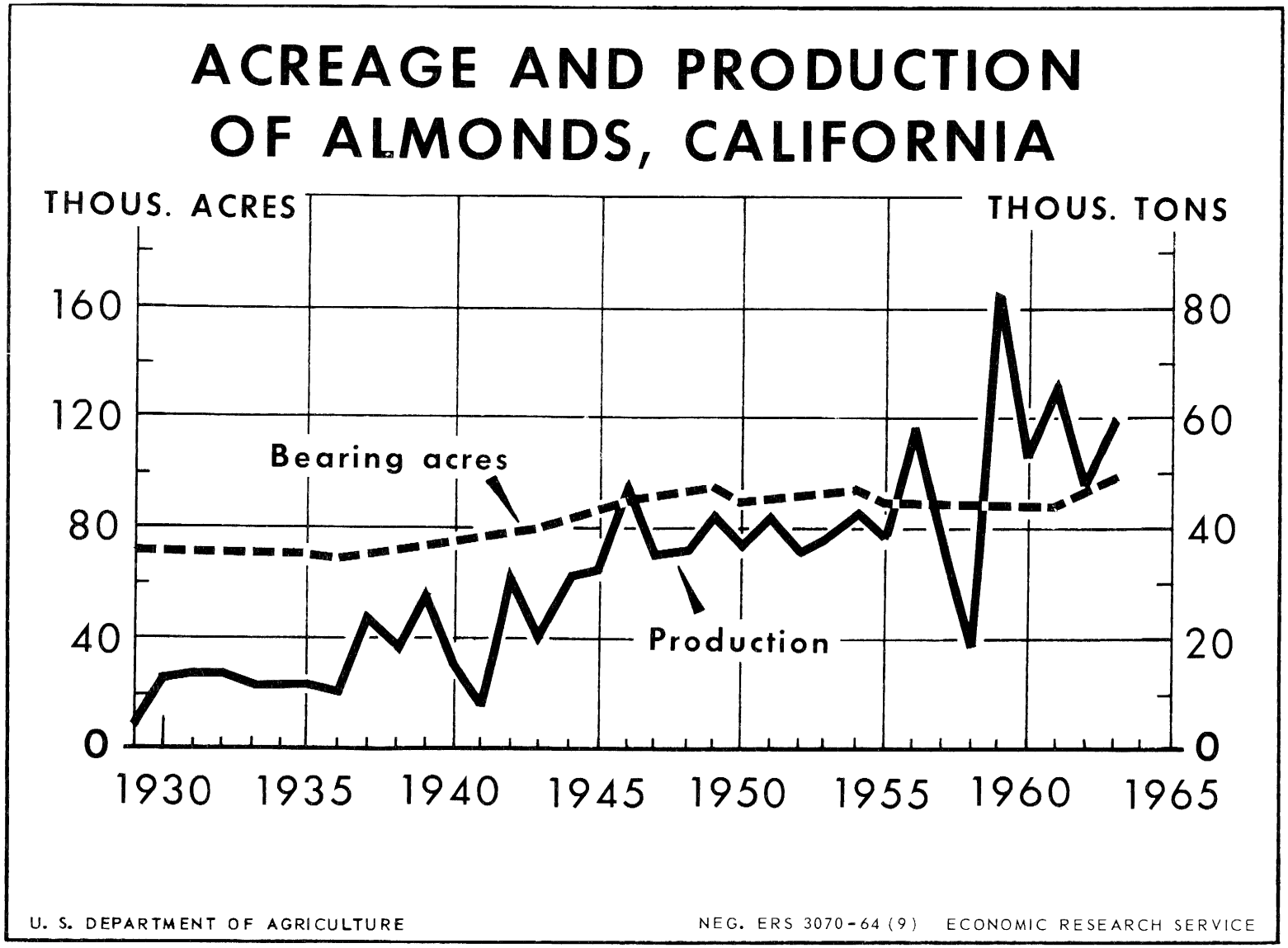
ACREAGE AND PRODUCTION
OF ALMONDS, CALIFORNIA
THOUS. ACRES
THOUS. TONS
160
120
80
40
0
80
60
40
20
0
Bearing acres
Production
1930
1935
1940
1945
1950
1955
1960
1965
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 3070-64 (9) ECONOMIC RESEARCH SERVICE

Figure 2

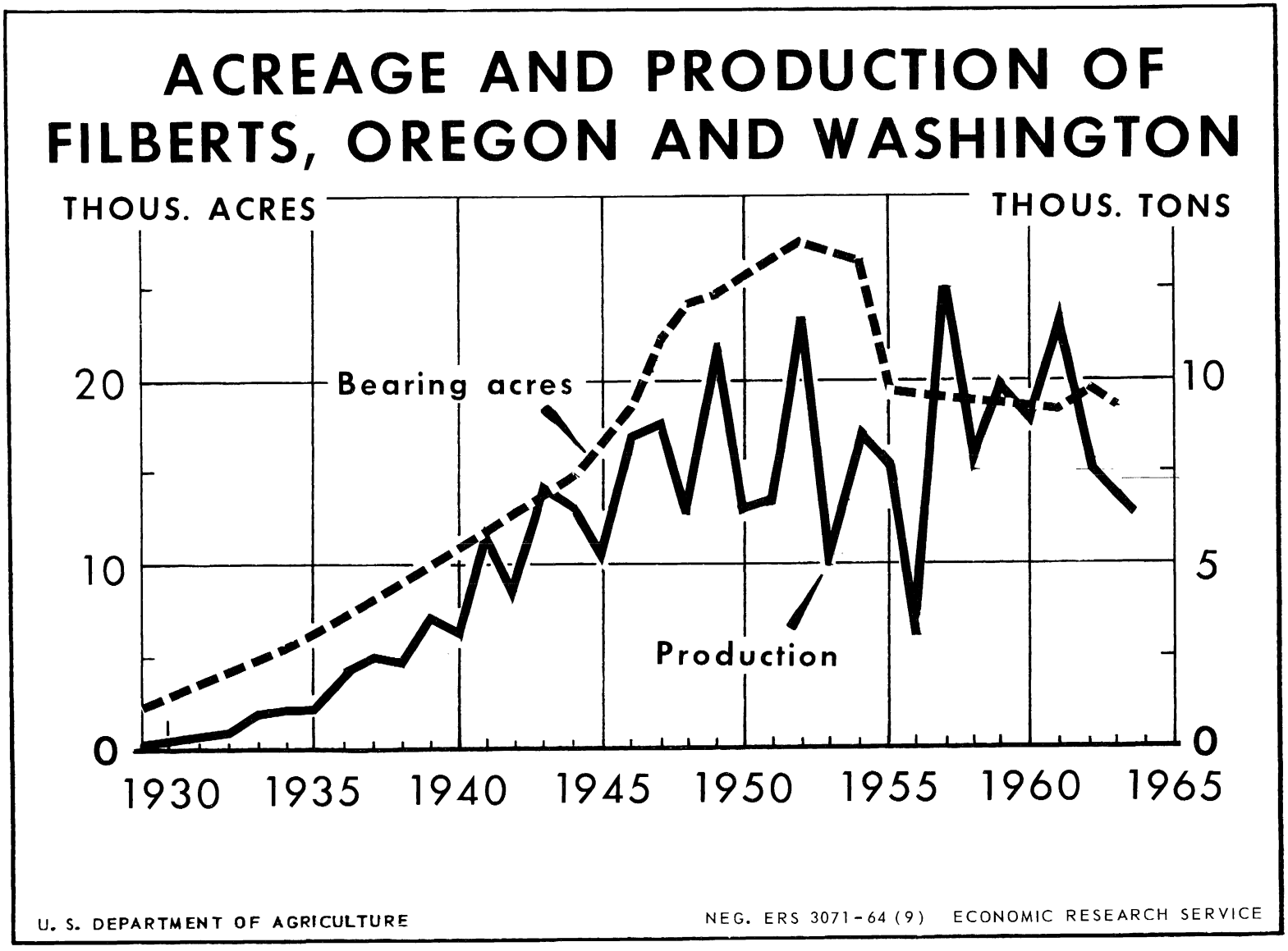
ACREAGE AND PRODUCTION OF FILBERTS, OREGON AND WASHINGTON
THOUS. ACRES
THOUS. TONS
20
10
0
10
5
0
Bearing acres
Production
1930
1935
1940
1945
1950
1955
1960
1965
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 3071-64 (9) ECONOMIC RESEARCH SERVICE

Figure 3

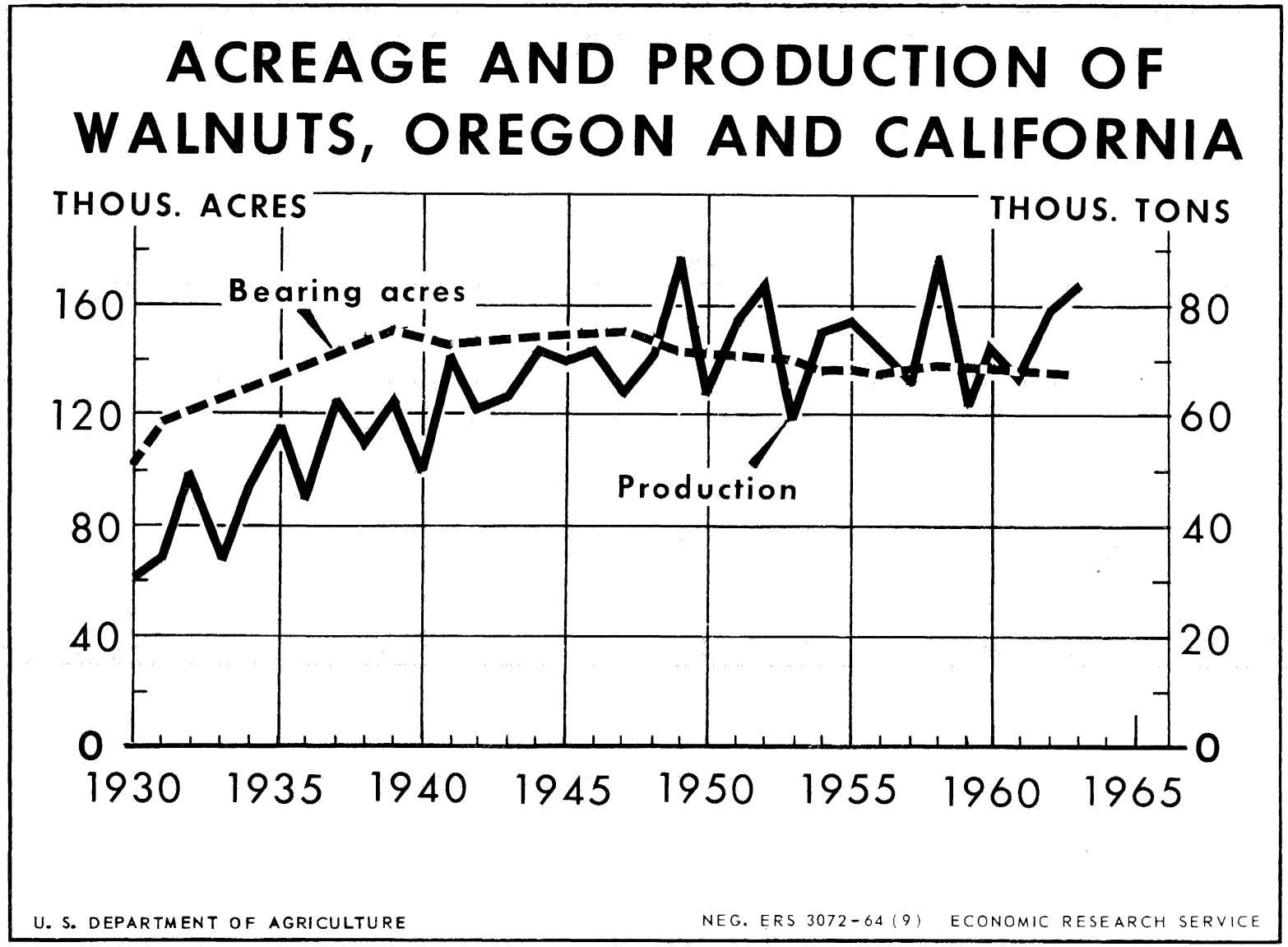
ACREAGE AND PRODUCTION OF WALNUTS, OREGON AND CALIFORNIA
THOUS. ACRES
THOUS. TONS
Bearing acres
Production
160
120
80
40
0
80
60
40
20
0
1930
1935
1940
1945
1950
1955
1960
1965
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 3072-64 (9) ECONOMIC RESEARCH SERVICE

Figure 4

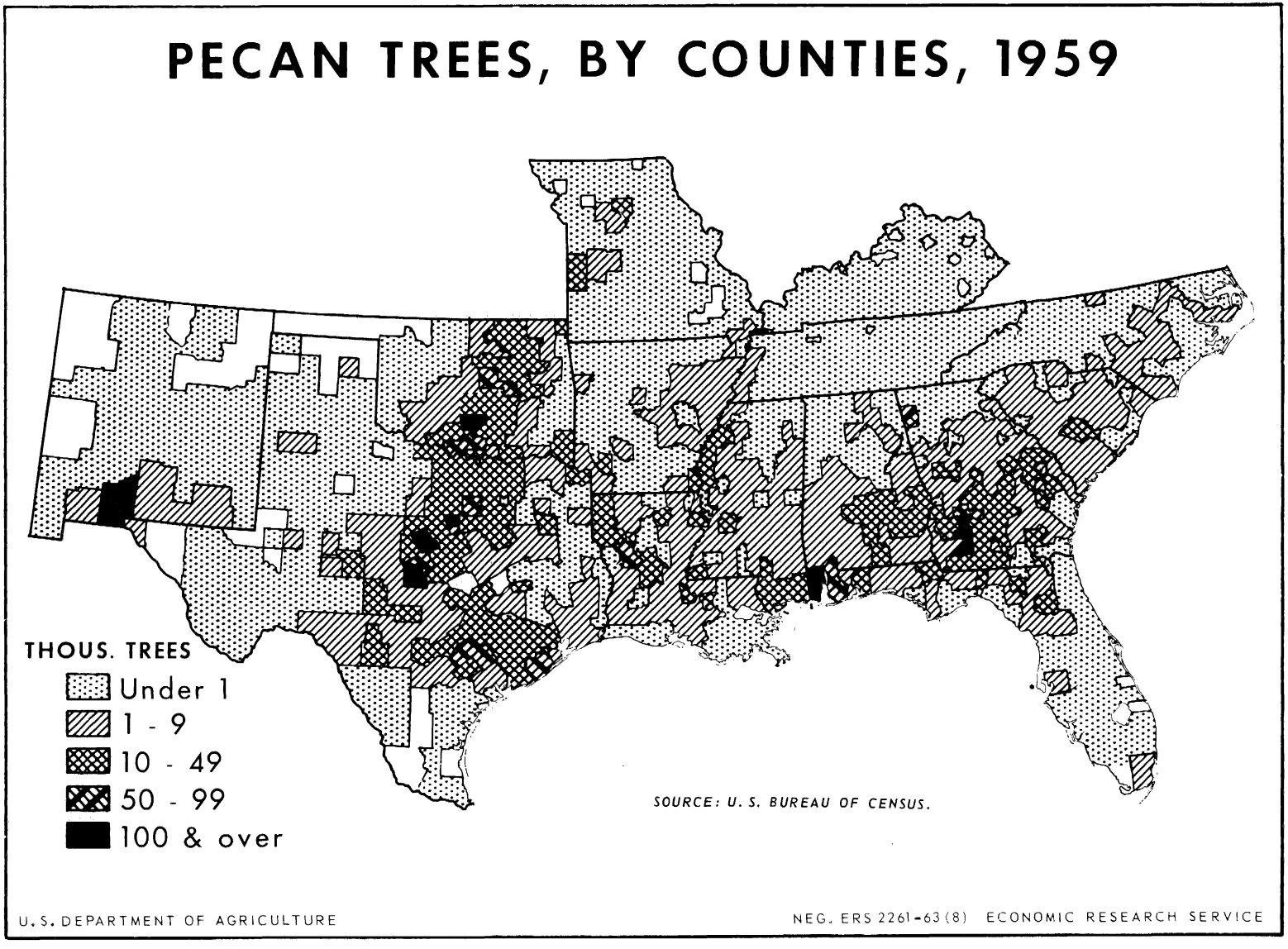
PECAN TREES, BY COUNTIES, 1959
THOUS. TREES
Under 1
1 - 9
10 - 49
50 - 99
100 & over
SOURCE: U. S. BUREAU OF CENSUS.
U.S. DEPARTMENT OF AGRICULTURE
NEG. ERS 2261-63(8) ECONOMIC RESEARCH SERVICE

Figure 5

prevailing price is not favorable. Total production of pecans has shown a steady trend upward, with sharp variations in year-to-year production because of the biennial production habit of pecan trees. Most of the upward trend is due to the increasing portion of the total crop originating from cultivated, improved varieties of trees. In 1929, the total crop of 26,670 tons consisted of 83 percent wild (seedling)pecans. During 1959-63, when average production was 101,285 tons, 53 percent consisted of improved varieties (fig. 6). Georgia, Alabama, Mississippi, and New Mexico usually lead in the production of improved varieties. Texas, Oklahoma, and Louisiana produce most of the seedling pecans. Average total production of all pecans increased 193 percent from 1929-33 to 1959-63.

Federal Marketing Programs

The marketing of domestically produced almonds, filberts, and walnuts is regulated under Federal marketing agreement and order programs, as authorized under the Agricultural Marketing Agreement Act of 1937, as amended. These programs are designed to improve grower returns through the establishment of minimum quality standards and/or volume restrictions, which provide adequate supplies to domestic markets, and for the diversion of the surplus portion of the crop to noncompetitive outlets. The quality of in-shell pecans that entered into interstate trade from 5 southeastern States was regulated in the early 1950's, but the pecan marketing order was discontinued after the 1955-56 season.

In addition to Federal marketing agreement and order programs, the Department of Agriculture has the authority under Section 32 of Public Law 320, 74th Congress, as amended, to assist in the removal of surpluses by purchases and diversion payments. Since 1950, the Department has spent approximately $9 million for the removal of tree nut surpluses, mostly in the form of diversion payments, although some nuts have been purchased for school lunch programs.1/ In recent years, however, there has been little need for Federal assistance in removing tree nut surpluses. There has been only 1 such program (in 1958) in the past 10 years.

World Production

The foreign production of almonds, filberts, and walnuts is concentrated in countries with mild, dry climates bordering the Mediterranean Sea. In some of these countries, only part of the total production is on a commercial basis. In addition to orchards or groves, nut-bearing trees are found growing in scattered plantings amidst field crops or other tree crops, along roads and in yards. For this reason, and inadequacies in crop-reporting methods, data on acreages used for growing these nuts are of limited usefulness. Estimates of production are more meaningful.

1/ Expenditures consisted of $1,713,346 for almonds; $262,692 for filberts; $2,806,235 for pecans (school lunch); and $4,425,901 for walnuts.

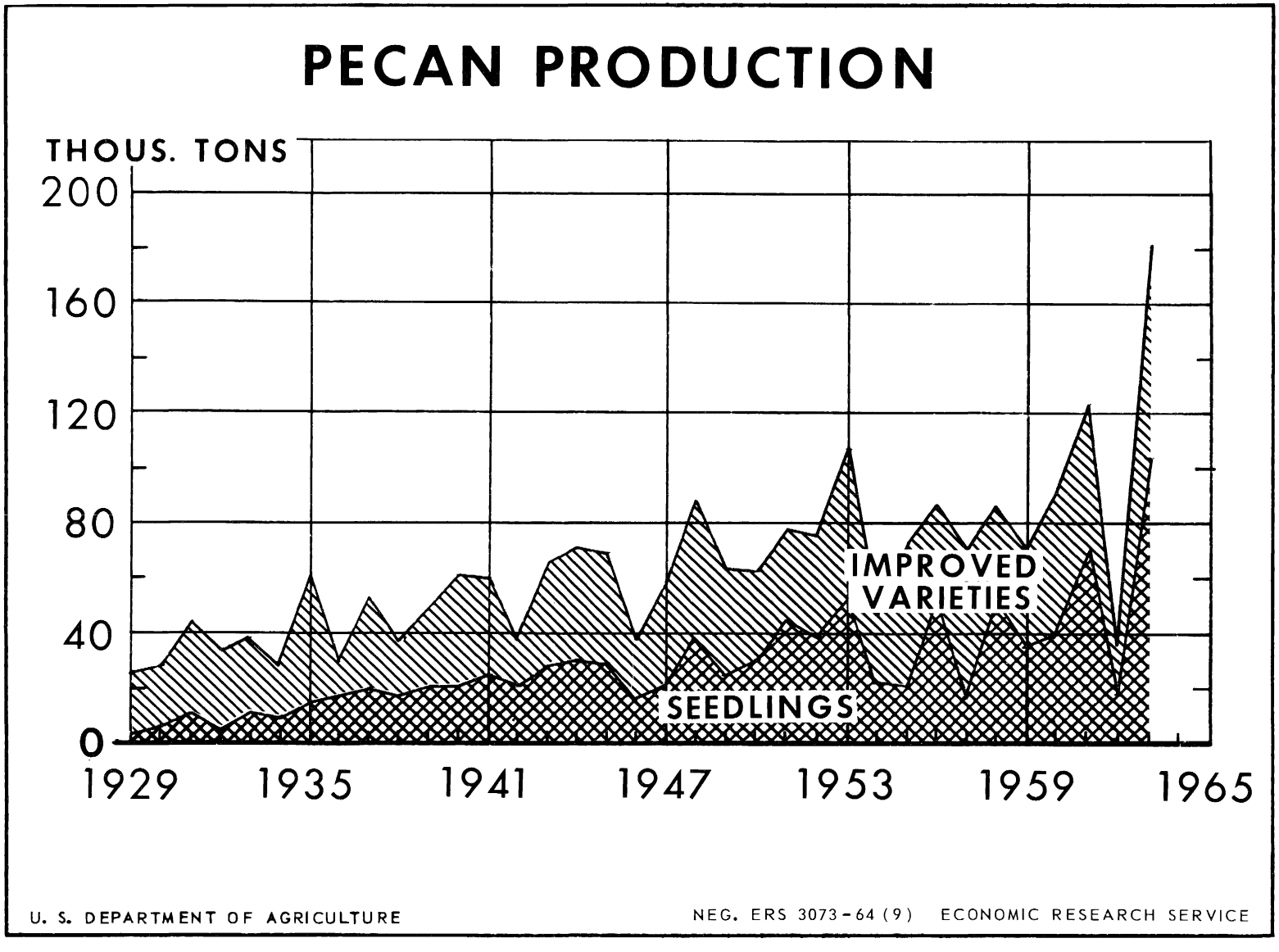
PECAN PRODUCTION
THOUS. TONS
200
160
120
80
40
0
1929
1935
1941
1947
1953
1959
1965
IMPROVED VARIETIES
SEEDLINGS
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 3073-64 (9) ECONOMIC RESEARCH SERVICE

Figure 6

Italy produces the largest portion of the world supply of almonds. During 1958-62, Italy's production accounted for 31 percent of the world total. Spain and the United States each produced an average of 28,200 short tons during that period, or 27 percent each of the world total. Production fluctuates violently in Italy, however, and in some years may be lower than production in Spain or the United States. The trend of production is more sharply upward in the United States than in either Spain or Italy, and domestic almonds will probably comprise 40 percent or more of world production by 1970. Iran, Morrocco and Portugal produce most of the remainder of the world almond crop, but production in these countries has changed little from the 1935-39 average.

During 1958-62, Turkey produced 58 percent of the world filbert crop. Italy produced about 27 percent, Spain 9 percent, and the United States about 6 percent. Production in other countries is scattered and negligible in world trade.

The production of walnuts is found in more countries than any of the other tree nuts, but production figures are unreliable. The United States is the leading producer of walnuts, producing nearly half of the world total. Many countries produce substantial quantities of walnuts, but the Department of Agriculture considers estimates of the commercial crop more reliable than the total production figures for Italy, Turkey, Iran, India, Yugoslavia, and Syria. Among the countries for which data are available, during 1958-62 the United States produced more than 47 percent of the world commercial crop; France and Italy, 16 percent each; India, 8 percent; Turkey, 5 percent; and Iran, Syria, and Yugoslavia less than 5 percent each. Quantities of walnuts are also produced in China and in some of the Iron Curtain countries, but reliable estimates of total production in these countries are not available.

The pecan tree is a native of North America and the United States is the only substantial producer of pecans, with the exception of an estimated average annual production of 5 million pounds in Mexico.

Other tree nuts which are not grown in the United States, but are competitive with domestic production, are cashew nuts and brazil nuts. Cashew trees grow profusely in many tropical regions, but nuts are harvested mostly in India, Tanganyika, Kenya, and Mozambique. Practically all of the processing--a rather complicated process requiring much hand labor--is done in India. The principal producer and exporter of brazil nuts is Brazil, where the trees grow wild. Total harvest of both cashews and brazil nuts depends largely upon the price these nuts will bring in New York.

Imports

With the exception of the World War II period, when imports of tree nuts dropped to approximately 10 percent of the 1935-39 average, the trend of tree nut imports has been upward since 1929. However, total imports have not risen as much as domestic production, and the United States now produces more tree nuts than are imported, which is the reverse of the situation prior to 1931.

In addition, the increase in total imports has resulted from increased use of nuts which are not produced in this country. Imports of domestic-type tree nuts have actually declined.

Tree nuts are imported into the United States both in-shell and shelled. Increases in the volume of imports of shelled tree nuts are due to the growth in popularity of the cashew nut, which has never been imported in-shell. An increasing portion of imports of domestic-type tree nuts are also on a shelled basis. Imports of in-shell tree nuts totaled only 12,935 tons in 1962, compared with the 1959-62 average of nearly 21,000 tons and a high of 28,960 tons in 1932. Brazil nuts comprised 36 percent of the 1959-62 imports of in-shell tree nuts. Chestnuts were 35 percent of the total, and pistachios, 27 percent. The remaining 2 percent consisted of small quantities of almonds, filberts, pecans, pignolias, and walnuts (table 1, Appendix table 12).

While imports of shelled tree nuts increased from 1929 to 1962, imports of domestic-type tree nuts--with the exception of filberts, and minor quantities of pecans--have declined. The rise in total imports of shelled tree nuts has been due entirely to the increasing popularity of cashew nuts, and the great increase in their importation. Between the two 5-year (average) periods, 1929-33 and 1959-62, total imports of shelled tree nuts increased from 19,709 tons to 38,218 tons. During the same interval, imports of cashews rose from 4,600 tons to 29,133 tons. During 1959-62, cashews comprised 74 percent of the total imports of shelled tree nuts. Shelled brazil nuts accounted for 12 percent, walnuts, 6, and filberts, 5. Small quantities of almonds, pecans, pignolias, and pistachios comprised the remaining 3 percent of the total (table 2, Appendix table 13).

Practically all of the almonds imported into the United States come from Spain or Italy. Since 1951, the majority have come from Spain, but before that Italy was the chief supplier. Almonds are imported both in-shell and shelled, depending on the domestic crop and prices, but most of the imports are shelled. The imported shelled almonds are used primarily by candy manufacturers and nut salters; in-shell almonds are sold in the in-shell nut mixtures through retail outlets.

Filberts are imported into the United States from Turkey, Spain, and Italy. Turkey is, by far, our major supplier. Since World War II, there has been a steady decline in the amount of filberts imported in-shell, and only 23 tons were imported on this basis from the 1962-63 crop. Italy was the sole supplier of in-shell filberts. Imports of shelled filberts have fluctuated from year to year, but the trend has been upward. Practically all of the shelled filberts come from Turkey, but small quantities are imported from Italy and some transshipped from West Germany. The nut-salting trade is the largest user of imported shelled filberts.

Walnuts may be imported from many foreign countries, both in-shell and shelled. Since 1960-61, only minor quantities have been imported in-shell, and all of these have come from Italy and France. France, Italy, and China were the major sources of supply for shelled walnuts, but since 1959-61 most of the shelled walnuts have been imported from Turkey and India. Other important

Table 1.--Average imports of in-shell tree nuts for specified years

Year	Almonds	Brazil	Chestnuts	Filberts	Pecans	Pignolias	Pistachios	Walnuts	Total
					Tons				
1929-33	497	8,735	9,191	2,511	--	--	720	1,143	22,797
1935-39	324	10,344	8,728	956	--	--	1,326	82	21,760
1939-43	93	6,855	2,867	134	28	1/	763	4	10,744
1949-53	29	8,267	8,924	82	6	14	3,342	25	20,689
1959-62	72	7,560	7,345	16	181	21	5,748	28	20,971

1/ Less than 1 ton.

Table 2.--Average imports of shelled tree nuts for specified years

Year	Almonds	Brazil	Cashews	Filberts	Pecans	Pignolias	Pistachios	Walnuts	Total
					Tons				
1929-33	4,645	2,846	4,600	1,668	119	193	117	5,521	19,709
1935-39	2,633	4,547	12,889	1,095	77	175	223	2,181	23,820
1939-43	2,489	3,874	10,257	509	62	79	101	1,101	18,472
1949-53	3,091	3,093	23,791	2,816	189	148	204	3,473	36,805
1959-62	241	4,781	29,133	2,071	241	229	213	2,422	39,331

suppliers of shelled walnuts are Iran, Italy, and Rumania. Most of the imported walnuts are smaller than domestic walnuts, and are used by the confectionery and baking industries.

The United States imports over half of the world exports of cashews. For all practical purposes, these originate in India, as cashews produced in Africa are exported to India for processing. Practically all of the cashews are used by the nut-salting trade, but they are becoming increasingly popular in the confectionery trade also. Brazil nuts are imported, both in-shell and shelled, almost exclusively from Brazil. Small quantities of shelled brazil nuts are also imported from Bolivia, Peru, and other South American countries. In-shell brazil nuts are sold in in-shell nut mixtures through grocery stores primarily during the holiday season. Shelled brazil nuts are used by nut salters and candy manufacturers.

Tariffs

The commercial production of edible tree nuts in the United States has been fostered partially by tariffs on imports of all tree nuts from other countries. Tariffs on domestic-type tree nuts are higher than on other kinds of nuts, such as brazil nuts and cashews (table 3). In addition, under Section 22 of the Agricultural Marketing Act of 1937, as amended, the President is authorized to impose quotas or fees on imports if it appears that nuts are being, or are likely to be, imported in such quantities as to render ineffective, or to interfere with, any program under the Act--i.e. the Federal marketing orders. This procedure has been used for almonds on a number of occasions, and has been requested by walnut marketers but never granted.

Expansion of the domestic tree nut industries in California and Oregon was partially fostered by tariffs on foreign tree nuts. Thus, a significant change in those tariffs would have a substantial impact.

Table 3.--Import rates of duty, edible tree nuts, United States, 1963

Kind of nut	Tariff rate per pound	
	Not shelled	Shelled
	Cents	
Almonds	5.5	16.5
Filberts	5.0	8.0
Pecans	5.0	10.0
Walnuts	5.0	15.0
Brazil nuts	0.375	1.125
Cashews	0.7	0.7

Source: Tariff schedules of the United States under Section 102 of the Tariff Classifications Act of 1962, as amended.

Outlook for Supplies

Domestic Supplies.--Like most of the other tree crops, the current supply of tree nuts is relatively unaffected by current economic forces. The current demand for and prices of tree nuts, however, have a great deal to do with supplies that can be expected in the 1970's, just as increased production in the 1930's resulted from plantings made during 1921-28 when prices were favorable to nut growers. The increased average production in the early 1950's resulted from plantings made during the high price period of World War II.

Expected supplies of domestic tree nuts for the next 4 or 5 years must come from trees which are bearing or near bearing age. Accurate data on the number of acres of bearing and nonbearing trees are available annually only for almonds and walnuts in California. In 1963, there were approximately 98,800 acres of bearing almond trees, a new record high, compared with the previous record high of over 95,000 acres in 1949. In 1962 (the last year for which data are available), nonbearing acreage was estimated to be 31,380 acres, the highest since the early 1920's when the industry was expanding rapidly. Bearing and nonbearing acreage in 1963 totaled over 129,000 acres, compared with 70,000- 80,000 acres in the 1920's.

The greatly expanded acreage of almond trees has been accompanied by higher yields of nuts per tree and per acre. New plantings of almonds have been made on new, fertile, irrigated land. The new plantings have also benefited from improved cultural practices, more efficient insect and disease control, and better protection from frost. Growers now report yields as high as 2,000 pounds of nuts per acre.

The total acreage of walnuts in California has also increased at a steady rate since the 1920's, the increases in northern and central California more than offsetting the decreases in southern California. In 1962, there were over 165,000 acres of walnuts in California. The total consisted of 126,200 acres of bearing trees and more than 39,000 acres of nonbearing trees. The bearing acreage was the largest since 1947, when the population explosion in southern California began to envelop the walnut land, and, in the early 1950's, reduced bearing acreage to 113,000 acres. The nonbearing acreage was the largest since the early 1930's. New plantings were less in 1963 than in any year since 1950, but the huge plantings made in the late 1950's in central and northern California indicate increased walnut production in the years ahead.

Although data are not available concerning the acreage of pecan trees, indications are that increased plantings of pecan trees have been made. Large acreages of pecans have been planted in Georgia, Arkansas, Texas, and New Mexico. Pecan production of New Mexico was not included in the national pecan production data in the mid-1950's, but now, that State is one of the leading producers of improved varieties of pecans.

The average annual production of pecans has trended upward over the past 30 years, and the 1963 production of nearly 365 million pounds was the highest on record. A mail survey of nurseries that propagate and sell pecan trees

indicated that sales of trees rose from 370,220 in 1958-59 to 748,496 in 1961-62.2/ Nurseries expected further increases in sales through the next 4 years.

The tremendous increase in the number of pecan trees propagated and the larger number of trees planted in large groves assure increased pecan production in the years ahead. It is also indicated that an increasing portion of the total pecan crop will consist of improved varieties.

Between 1949 and 1959, the number of filbert trees in Oregon and Washington declined from 2.4 million to 1.5 million. Tree numbers were reduced further by the severe windstorm in 1962. Nearly 87,000 trees were uprooted by the storm. An additional 84,000 were blown over but were reset. It is estimated that there were about 1.5 million filbert trees of all ages in Oregon and Washington in 1963. The acreage was estimated to be 18,547 acres, the lowest since the mid-1940's.

There is some evidence that growers are optimistic about the future of the filbert industry and wish to expand production. However, there is a severe shortage of nursery stock and the shortage will not be alleviated before 1965. Any great expansion in the filbert industry cannot be expected before the mid-1970's. Growers intentions to plant additional trees will be strongly influenced by world production of filberts, the impact on domestic prices, and alternative land-use opportunities. Present production trends in foreign countries are upward, but so are population trends. Thus the filbert industry will probably be confronted with supply-demand relationships similar to those that now exist. These relationships are not conducive to rapid industry growth.

Foreign Supplies.--The trend of production of all domestic-type tree nuts is upward in countries that are important world suppliers. However, the rate of production increase is less than the rate of population growth. Hence per capita supplies of tree nuts should remain at or slightly below present levels in the years ahead. Further increases in production can be expected in those countries that appear to have a comparative advantage in tree nut production. The share of world production supplied by countries that are now minor suppliers can be expected to decrease.

DOMESTIC MARKETING FIRMS

There are more than 150 firms in the United States that are directly engaged in procuring nuts, shelling them (or otherwise preparing them for market), and selling them to retail, wholesale, or industrial outlets. Approximately 80 of these firms are primarily engaged in marketing pecans. The remaining firms are located in California and Oregon, and are engaged in marketing almonds, filberts, and walnuts.

2/ Powell, Jules V. The Pecan Nursery Industry--Structure and Economic Aspects. U.S. Dept. Agr., Agr. Econ. Rpt. 44, Oct. 1963.

Almonds

The entire crop of almonds is marketed by 8 major firms, and 7 smaller firms, some of which are only in the market occasionally. Interviews were held with 6 of the major firms during the summer of 1963, and data were collected on the 1962 crop. The leading marketing firm in the almond industry is the California Almond Growers Exchange, a cooperative, which markets approximately 70 percent of the California almond crop. The Exchange handles almonds exclusively, while most of the other major firms handle other nuts as well. At least two of the firms are, or are subsidiaries of, large food corporations that market other food products as well as other kinds of domestic and imported tree nuts.

Of the 6 major firms interviewed, 3 were corporations, 2 were cooperatives, and 1 was a partnership. Four of the firms had been in business more than 20 years. The California Almond Growers Exchange, the oldest, has been in business 53 years. Two of the firms, 1 cooperative and 1 corporation, had been in business less than 10 years.

Led by the Exchange, the marketing of almonds has been more aggressive than the marketing of any other domestic nut. The seemingly endless array of almondine main-course dishes and desserts, and new candy products which advertise the natural complimentarity of chocolate and almonds have not happened by chance. The concerted effort and planning by almond growers and marketers to supply almonds of the kind and in the form that food manufacturers want is epic of the cooperative movement in the United States.

Filberts

Interviews were obtained with 9 Oregon and 2 California firms that market filberts. Approximately four-fifths of the sales of in-shell filberts are made by the 4 largest Oregon handlers. Over half of the total sales of shelled filberts are made by 2 of the Oregon shellers.

Five of the Oregon firms are corporations and 3 are cooperatives. One is a proprietorship. In 1963, one of the corporations marketed filberts for a cooperative until this arrangement was discontinued in July. The marketing of filberts has been marked by rivalrous competition among the marketing agencies and particularly among the cooperatives, none of which has enough volume for significant market influence. Partially because there is no cohesive force in the filbert industry, marketing patterns within the industry have been slow to change, and the shift from in-shell to shelled sales has been slower than in most of the other tree nut industries. Part of the reason for this is the sharp competition from imported shelled filberts. Handlers believe the demand for in-shell filberts is inelastic, for shelled filberts very elastic. Thus a nearly constant quantity of in-shell filberts is sold each year, and the amount shelled varies directly with the size of the crop and prices of imported filberts. In most years, grower returns for in-shell filberts have exceeded the returns from shelled filberts.

Pecans

Pecans are marketed by approximately 80 firms located throughout the pecan belt from North Carolina to New Mexico and in St. Louis, Chicago, and Pittsburgh. The concentration of shellers is greatest in those areas where pecan production is heaviest--Georgia and Texas. The concentration of pecan shellers in St. Louis and Chicago stems from the early 1900's when in-shell pecans were loaded in bags and sent up the Mississippi River to be sold for whatever price they would bring. The shelling industries were started as a salvage operation for the pecans that remained unsold after the holiday season.

Eight large firms market nearly 50 percent of the shelled pecans, and 37 firms market approximately 90 percent of all pecans that enter commercial channels. The remaining firms are small, may not be actively engaged in handling pecans every year, and are never in business more than 2 or 3 months during the peak marketing season. Most of their sales are made to local bakeries, confectioners, and gift packers. Of the large firms, one is a cooperative and the others are corporations.

The pecan industry was a conglomerate of small localized markets throughout the South until the late 1920's and early 1930's when automatic shelling machines came into wide use. At about this time there was increased interest in pecans as a cash crop, and research was begun to find ways to increase yields and reduce the wide biennial production fluctuations through fertilization and insect and disease control programs. High prices for pecans in the 1940's and early 1950's gave impetus to the pecan industry.

There was no cohesive marketing force in the pecan industry, however, until the early 1950's. In 1950, the Gold Kist Pecan Growers Association, a cooperative, entered the pecan field and, with ample backing from its parent organization, The Cotton Producers Association, rapidly became a leading marketer of pecans with international as well as national marketing affiliations.

At about the same time, the independent pecan shellers, who had been until then highly competitive individualists, formed the National Pecan Shellers and Processors Association. Through the Association, the shellers were able to keep more fully apprised of supplies and prices. Also they began aggressive advertising and promotion campaigns to encourage the use of pecans. These campaigns have been notably successful.

The pecan industry is still in a state of flux, however, and many changes are taking place which will alter the competitive position of pecans in the years ahead. The pecan industry is inherently speculative because of the biennial production habit of pecan trees and the usual, but not always, wide fluctuations in supplies from year to year. Much of the speculation is being taken out of the industry, however, by increased knowledge concerning supplies and prices, and by the cooperative, which by its nature acts as a market stabilizer.

An additional stabilizing force is the entry of large multi-product food corporations into the pecan business. Within the past 6 years, 3 of the largest pecan-shelling establishments have been purchased by large food corporations. In order to assure themselves of adequate and regular supplies of pecans for their products, which must be planned months in advance, these corporations have found it desirable to purchase their own pecan shelling (and storage) facilities.

Another entry into the pecan marketing field is the large grower-sheller. These highly integrated organizations produce, shell, and market their own pecans. Spurred by the success of such a firm in New Mexico, other firms have been started in Texas and Arkansas.

Although the pecan is native to North America, the pecan industry, from an organizational point of view, is the youngest domestic tree nut industry. The rapid and dramatic changes that are taking place in the industry portend vastly different supply-demand relationships for pecans in the future.

Walnuts

Walnuts are marketed by approximately 40 firms in California and 20 in Oregon. Six of the largest firms in California and 6 in Oregon were interviewed. The Diamond Walnut Growers, a cooperative, is by far the largest marketer of walnuts. It markets a vast majority of all the in-shell walnuts, and also handles more shelled walnuts than any other handler. About 7 other California walnut handlers are large. Most of the rest are small and tend to emphasize the shelled market, rather than the in-shell market, possibly because of the strong position of the cooperative and its advertized brand in the in-shell market. Only one of the Oregon walnut handlers is a real factor in the walnut industry. Although Oregon produces a walnut of good quality, the crop is harvested much later than in California; yields per acre and kernel percentages are lower, and processing costs are higher, thus putting Oregon walnuts at a competitive disadvantage with California walnuts.

Of the California firms that market walnuts, 4 are corporations or subsidiaries of large corporations, 2 are cooperatives, and the balance are partnerships or proprietorships. Four California firms handle other nuts as well as walnuts; 12 handle both shelled and in-shell walnuts; the balance handles only shelled walnuts. Of the Oregon firms, 2 are corporations, 4 are cooperatives, and the balance proprietorships or partnerships. In Oregon, all of the firms that handle walnuts also handle filberts, with filberts being their main enterprise, except for the largest firm which handles more walnuts than filberts.

On the average, the independent California firms have been in business fewer years than the Oregon firms. Most of the California firms have been in business 20 years or less, while most of the Oregon firms have been in business more than 30 years. The California independent handlers were partially fostered by the shift of the walnut industry from southern California to northern California and the shift from in-shell to shelled uses. When the Cooperative

shifted its headquarters to a new, expensive shelling and packing plant in northern California, returns to producers dropped, and independents were able to make serious inroads into the Cooperative membership by providing them with higher returns. The independents were further abetted by other management and marketing changes which were taking place within the walnut industry. The Cooperative has weathered this period, however, and with new aggressive salesmanship and new methods of marketing shelled as well as in-shell walnuts and pecans, it has recouped some of the ground lost during the late 1950's.

DISPOSITION

Domestic Consumption

The consumption of individual kinds of nuts varies from year to year depending on the relative supplies and prices of each kind. For example, if walnuts are plentiful relative to almonds, filberts, and pecans, a larger proportion of walnuts is included in the in-shell mixtures sold primarily through retail food stores. Similarly, if filberts or almonds are plentiful relative to other tree nuts, more of them will be included in the in-shell mixtures as well as in the shelled, salted mixtures.

Table 4.--Per capita disappearance of selected types of tree nuts, United States, specified years 1/

Year	Almonds	Filberts	Pecans	Walnuts	Other 2/	Total
			-Pounds-			
Average 1920-24	.27	.10	.11	.43	.36	1.3
1925-29	.24	.09	.19	.44	.26	1.2
1930-34	.15	.04	.21	.32	.30	1.0
1935-39	.17	.04	.26	.34	.46	1.3
1940-44	.20	.05	.34	.38	.26	1.2
1945-49	.32	.10	.33	.39	.42	1.6
1950-54	.27	.07	.36	.40	.53	1.6
1955-59	.24	.07	.35	.36	.55	1.6
1960	.23	.07	.39	.35	.54	1.6
1961	.32	.07	.51	.30	.54	1.7
1962 3/	.20	.05	.14	.36	.56	1.3

1/ Crop year begins July of year indicated. Civilian per capita disappearance beginning 1941.

2/ Includes the following nuts: brazils, cashews, chestnuts, pignolias, pistachios and miscellaneous.

3/ Preliminary.

While the total consumption and per capita consumption of all tree nuts has trended upward since the 1920's, the per capita consumption of domestic-type tree nuts has remained about steady and that of other nuts has increased. Most of the increase in total consumption of tree nuts has been due to the increased use of the cashew nut, which, as previously noted, comprises approximately 74 percent of our total imports of shelled nuts. Because "carry-in" and "carry-out" data are not available for pecans, per capita production can be estimated much more accurately than per capita consumption. Therefore, the per capita consumption of pecans was probably less than .51 pound per person in 1961, and much greater than .14 pound per person in 1962.

Channels of Distribution

Domestic tree nuts are sold either shelled or in-shell but the proportion of the crop sold on a shelled basis has been increasing steadily in recent years. In-shell nuts are sold almost exclusively for home consumption in straight-packs or mixtures, principally during the holiday season in November and December. Shelled nuts are sold to candy manufacturers, the salting trade, bakers, households, ice cream manufacturers, and manufacturers of nut syrups and pastes (table 5).

Candy manufacturers are the main outlet for shelled almonds; salters use most of the shelled filberts; and most of the shelled pecans and walnuts are used by bakers and for home consumption. As a whole, confectioners are the most important outlet for shelled domestic tree nuts, using approximately 28 percent of the total. The baking industry uses about 22 percent, households use 24 percent and the salted-nut trade uses about 9 percent. Ice cream manufacturers and manufacturers of nut pastes and syrups use approximately 7 and 8 percent, respectively.

Almonds.--Approximately 93 percent of the almonds are marketed on a shelled basis (fig. 7). Confectioners are the largest users of shelled almonds. In 1962-63, approximately 44 percent of the entire almond crop was sold to confectioners. Salters used about 15 percent of the crop, and about 11 percent was sold for household use through grocery wholesalers and retailers. Ice cream manufacturers used approximately 8 percent of the crop. An increasingly important use of almonds is for prepared food mixes and frozen foods. Noodles almondine, green beans almondine, various cake and frosting mixes using almonds, and other prepared foods are items which are having an impact on the dietary habits of consumers and on the marketing pattern for almonds. The varieties of almonds are diced, sliced, slivered, blanched, roasted, and salted so that there is a form of almond to meet almost every food need.

Filberts.--Most of the filberts are sold in-shell to wholesale and retail grocery firms for sale directly to consumers in packages of straight-packs or mixed nuts (fig. 8). The peak marketing season is in October, November, and December. About 5 percent are exported. Salters use almost 63 percent of the shelled filberts. Sales to households through wholesale and retail grocers

Table 5.--Shelled tree nuts--sales of major suppliers, by outlet, United States, 1963

Outlet	Almonds	Filberts	Pecans 1/	Walnuts	Total
			Million pounds		
Grocery wholesalers	2.0	.3	5.2	8.3	15.8
Retailers (direct)	4.0	.2	6.6	8.5	19.3
Salters	8.2	1.7	3.3	0.4	13.6
Confectioners	26.0	.1	11.8	2.8	40.7
Bakeries	5.5	.3	22.5	4.0	32.3
Ice cream manufacturers	4.4	*	3.9	1.4	9.7
Gift packers	.2	*	.8	--	1.0
Other 2/	4.3	*	4.6	2.9	11.8
	54.6	3/2.7	58.7	28.3	3/144.2
			Percent		
Grocery wholesalers	3.7	12.2	9.0	29.3	11.0
Retailers (direct)	7.3	7.0	11.0	30.0	13.4
Salters	15.1	62.7	6.0	1.6	9.4
Confectioners	47.6	3.4	20.1	10.0	28.2
Bakeries	10.0	12.2	38.0	14.2	22.4
Ice cream manufacturers	8.1	--	7.0	4.8	6.7
Gift packers	.1	--	1.0	--	0.7
Other 2/	8.1	2.5	8.0	10.1	8.2
	100.0	100.0	100.0	100.0	100.0

* Less than 100,000 pounds.

1/ Data for pecans were obtained during the 1961 season and refer to the 1960-61 crop.
2/ Includes syrupers, repackers, cellopackers, and exporters.
3/ Will not total because of small quantities of filberts.

account for 19 percent of shelled-filbert sales, and sales to bakeries 12 percent. Confectioners bought 3 percent of the shelled filberts in 1962-63, and other users 2.5 percent.

The filbert industry has been slower to change from the in-shell to the shelled market than other tree nut industries. The U.S. filbert industry is small and accounts for a minor portion of the world production. Production costs are higher in the United States than in other parts of the world. Practically all of the imports of filberts are shelled, and the price of these imports determines the price of the shelled domestic filberts.

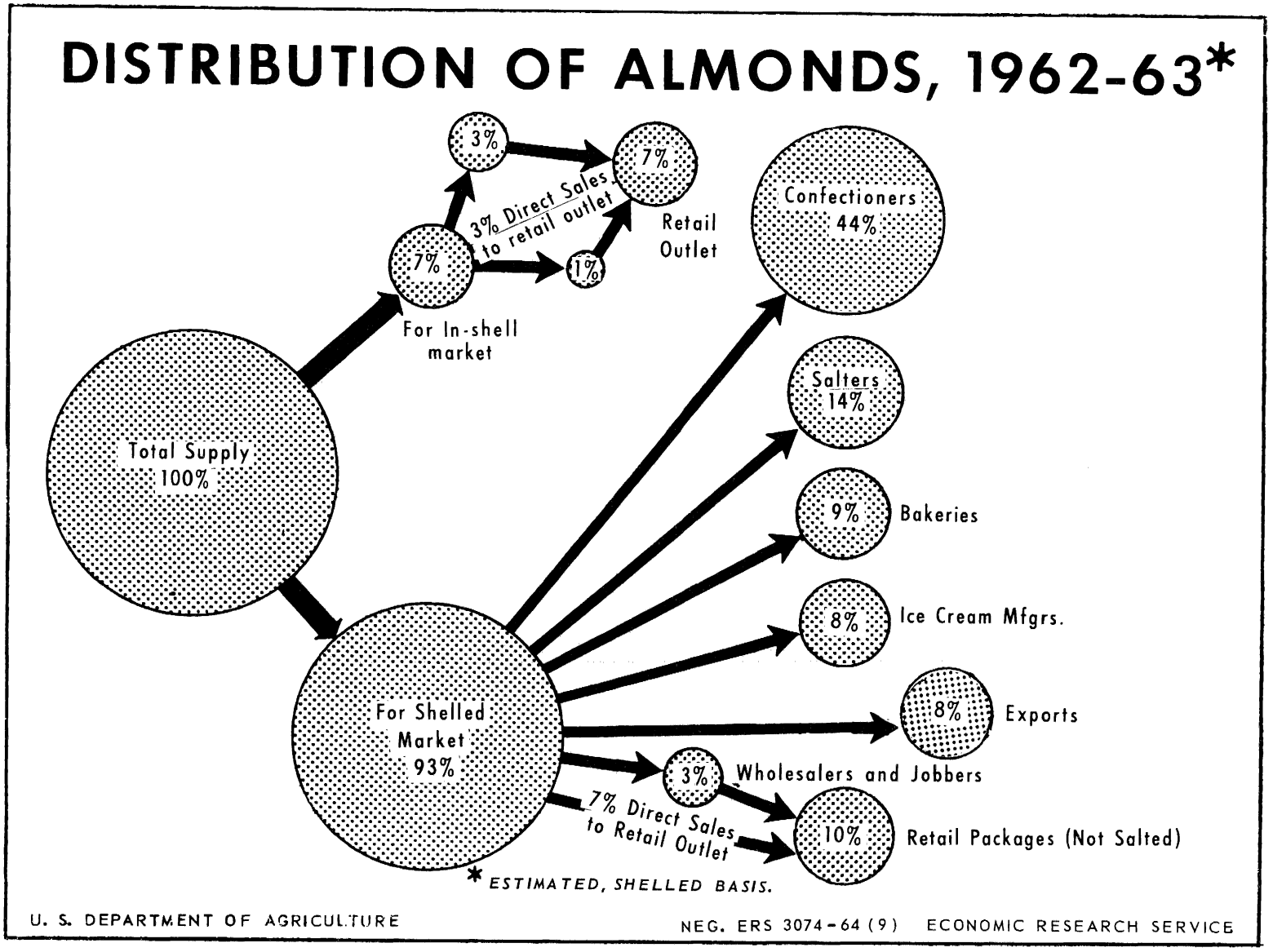
DISTRIBUTION OF ALMONDS, 1962-63*
Total Supply
100%
For In-shell
market
7%
3%
3% Direct Sales
to retail outlet
7%
1%
Retail
Outlet
For Shelled
Market
93%
Confectioners
44%
Salters
14%
9%
Bakeries
8%
Ice Cream Mfgrs.
8%
Exports
3%
Wholesalers and Jobbers
7% Direct Sales
to Retail Outlet
10%
Retail Packages (Not Salted)
* ESTIMATED, SHELLED BASIS.
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Figure 7

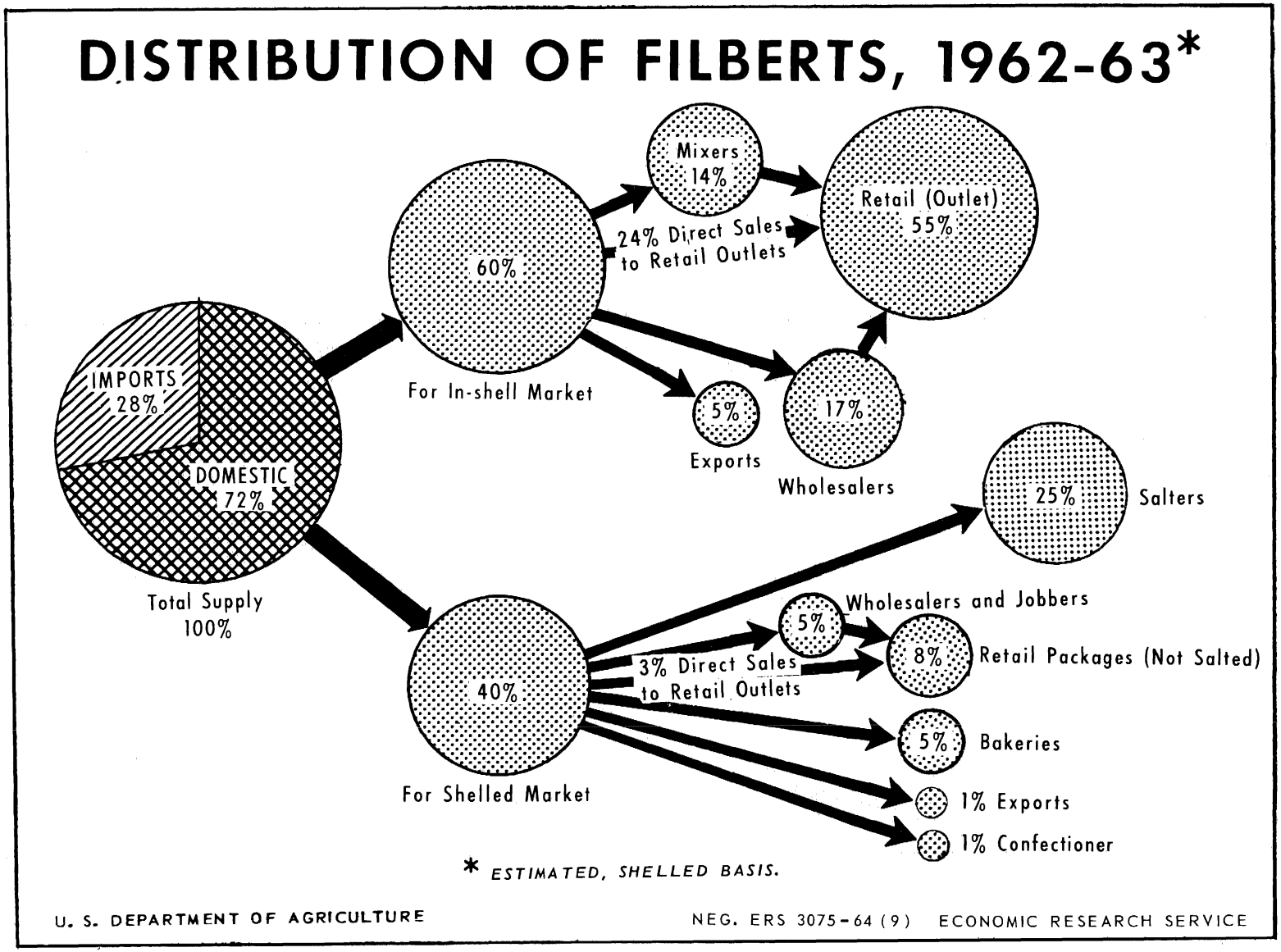
DISTRIBUTION OF FILBERTS, 1962-63*
IMPORTS 28%
DOMESTIC 72%
Total Supply 100%
60%
For In-shell Market
Mixers 14%
24% Direct Sales to Retail Outlets
Retail (Outlet) 55%
5%
Exports
17%
Wholesalers
40%
For Shelled Market
25%
Salters
5%
Wholesalers and Jobbers
3% Direct Sales to Retail Outlets
8%
Retail Packages (Not Salted)
5%
Bakeries
1% Exports
1% Confectioner
* ESTIMATED, SHELLED BASIS.
U. S. DEPARTMENT OF AGRICULTURE
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Figure 8

Oregon filberts dominate the domestic in-shell market, however, because Oregon marketers regularly supply large, well-graded filberts that are preferred in the United States. The growing European market has become increasingly lucrative for Turkish filberts, both shelled and in-shell. This expanded market has alleviated, somewhat, the pressure of imports on prices for domestic filberts.

Pecans.--The trend to marketing nuts on a shelled basis has been as pronounced for pecans as it has been for almonds. According to a survey made in 1961, approximately 94 percent of the pecans that entered commercial channels were shelled (fig. 9).3/ Since that time, most of the larger firms that sell both in-shell and shelled nuts have discontinued sales of in-shell pecans. The in-shell pecans that are sold go almost exclusively into straight-packs and mixtures of nuts for home use.

In 1961, the primary user of shelled pecans was the baking industry. Bakeries used 38 percent of the total supply. Sales to households through grocery wholesalers and chainstores accounted for 20 percent of the sales. Candy manufacturers used an additional 20 percent. Nut salters used 6 percent of the shelled pecans and ice cream manufacturers 7 percent. Syrupers, repackers, and cello packers used an additional 8 percent of the total.

Walnuts.--The walnut industry has been slow to shift from the in-shell to the shelled market, but there is evidence that this shift is taking place. In 1962-63, approximately 58 percent of the walnuts were marketed shelled, compared with 47 percent in 1950-52 (fig. 10). Grocery wholesalers, chainstores, and mixers are the largest purchasers of in-shell walnuts, accounting for nearly all of the total. These outlets are also the principal users of shelled walnuts. There has been a rapid growth in popularity of vacuum-packed cans and cellophane packages of shelled walnuts sold in grocery stores for use by housewives in home food preparation. Other users of shelled walnuts are bakeries or bakery suppliers, 8 percent; confectioners, 6 percent; and ice cream manufacturers, 3 percent.

Exports

U.S. exports of domestic tree nuts usually are less than 10 percent of total production, and the amount varies from year to year depending on domestic supplies, world supplies, and prices. Since the mid-1950's most of our exports are shelled nuts. Walnuts account for most of the exports of in-shell nuts. Only small amounts of filberts and pecans are exported, either shelled or in-shell.

Almonds are exported both shelled and in-shell. Our principal customer for in-shell almonds is Canada. West Germany is by far the largest consumer

3/ Powell, Jules V. and Reimund, Donn A. The Pecan Shelling and Processing Industry--Practices, Problems, Prospects. U.S. Dept. Agr., Agr. Econ. Rpt. 15, Sept. 1962.

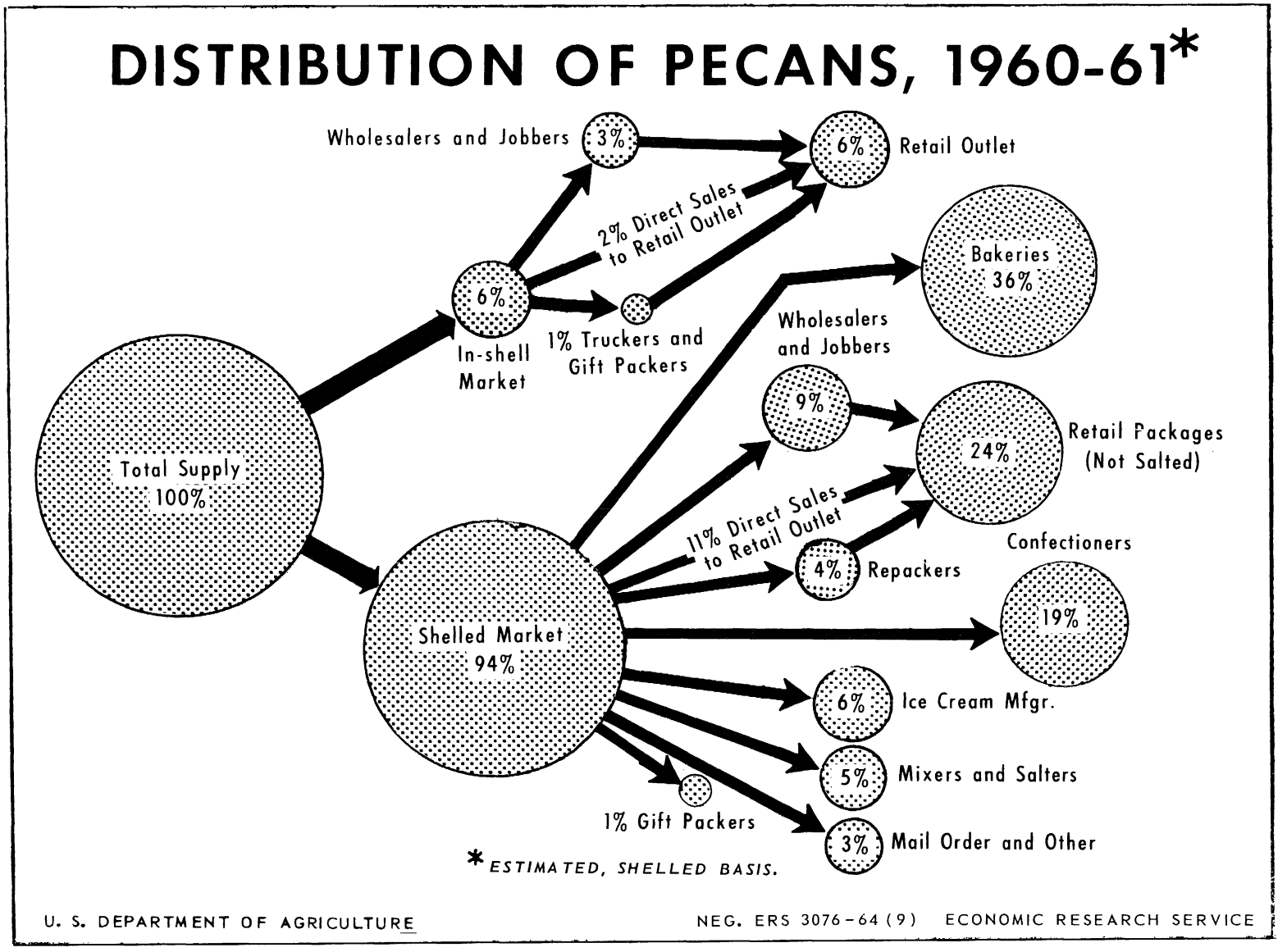
DISTRIBUTION OF PECANS, 1960-61*
Wholesalers and Jobbers
3%
6%
Retail Outlet
2% Direct Sales to Retail Outlet
6%
In-shell Market
1% Truckers and Gift Packers
Bakeries 36%
Wholesalers and Jobbers
9%
Total Supply 100%
24%
Retail Packages (Not Salted)
11% Direct Sales to Retail Outlet
Confectioners
4%
Repackers
Shelled Market 94%
19%
6%
Ice Cream Mfgr.
5%
Mixers and Salters
1% Gift Packers
3%
Mail Order and Other
*ESTIMATED, SHELLED BASIS.
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Figure 9

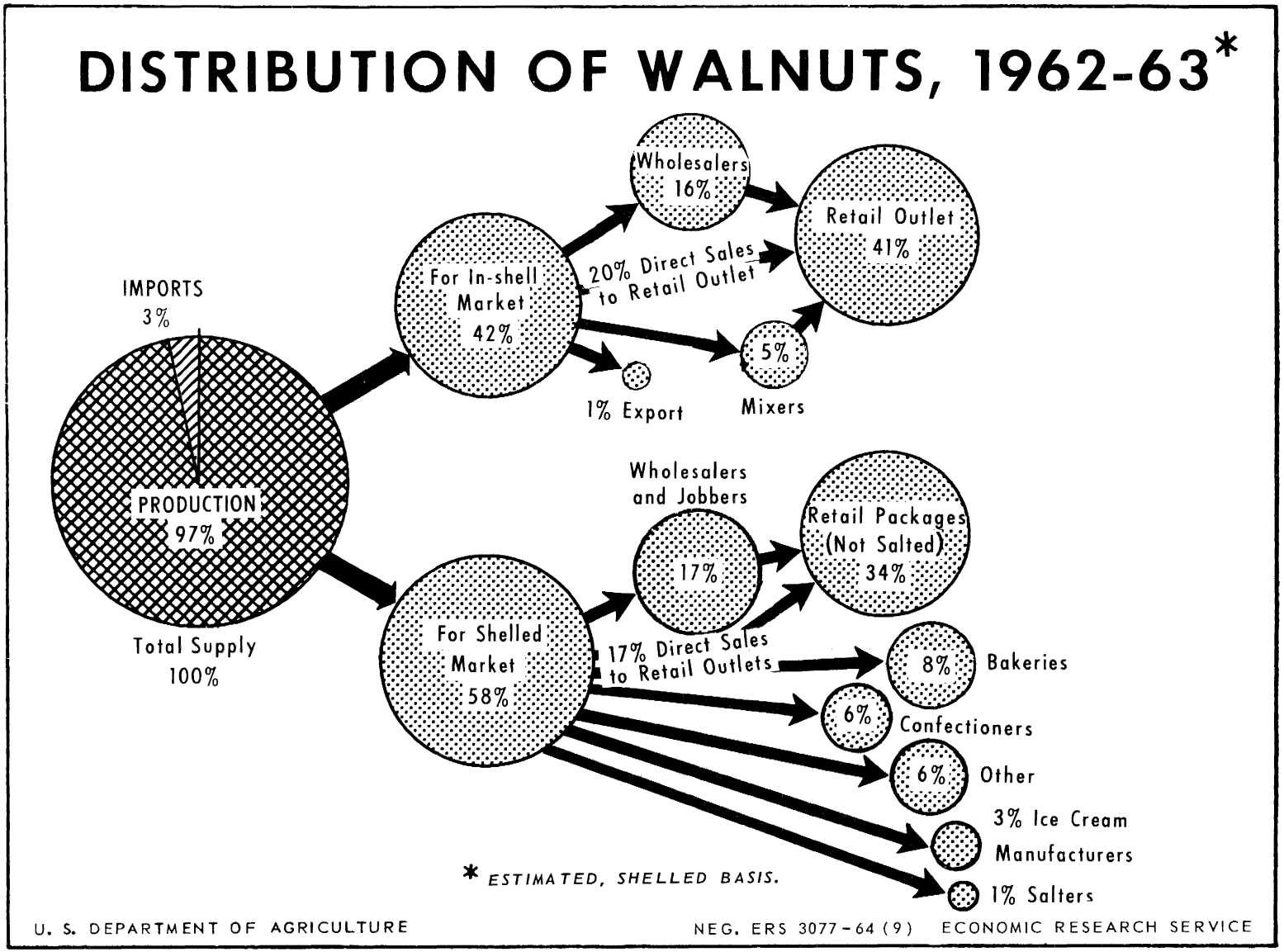
DISTRIBUTION OF WALNUTS, 1962-63*
IMPORTS
3%
PRODUCTION
97%
Total Supply
100%
For In-shell
Market
42%
Wholesalers
16%
Retail Outlet
41%
20% Direct Sales
to Retail Outlet
5%
1% Export
Mixers
For Shelled
Market
58%
Wholesalers
and Jobbers
17%
Retail Packages
(Not Salted)
34%
17% Direct Sales
to Retail Outlets
8% Bakeries
6% Confectioners
6% Other
3% Ice Cream
Manufacturers
1% Salters
* ESTIMATED, SHELLED BASIS.
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Figure 10

of our shelled almonds, but Japan, Canada, and the Scandinavian countries are also important. A few shelled almonds are also exported to Mexico and to South America.

Most of the exports of filberts are in-shell. Canada is by far the largest importer of our in-shell filberts. Other important customers are West Germany, the Scandinavian countries, and various countries in South America. Canada and the Scandinavian countries are our most important customers for shelled filberts. The filbert industry lost an important customer for in-shell filberts when the United States placed a trade embargo on trade with Cuba. During the 1950's, Cuba was our chief customer for in-shell filberts and often took as much as half of our total exports.

Few pecans are exported. In 1961-62, 525 tons were exported in-shell, and 659 tons were exported shelled. Canada purchased nearly half of our exports of in-shell pecans. The remainder went to the United Kingdom, the Netherlands and Sweden. Canada purchased nearly all of our exports of shelled pecans. The export market for pecans remains relatively untapped.

Walnuts are exported both shelled and in-shell but most are in-shell. In 1961-62, Canada purchased 800 of the 1,008 tons of in-shell walnuts exported. Canada also purchased a third of the exports of shelled walnuts. Other customers for walnuts are Mexico and some of the South American countries.

Outlook for Demand

Long range supplies of domestic tree nuts depend a great deal upon producers' appraisals of future economic conditions. The consumption of tree nuts is closely associated with population growth, the general price level, and the amount of consumer disposable income.

Assuming that per capita consumption of all tree nuts remains at approximately the same level, the supplies of tree nuts that will be needed to satisfy demand in 1985 have been computed (table 6). The Bureau of the Census estimates that the population of the United States will increase approximately 37 percent between 1965 and 1985. Assuming that per capita disappearance of domestic tree nuts remains at the 1955-59 level of 1 pound, more than 266 million pounds of the 4 major domestic tree nuts will be needed to satisfy the expected demand in 1985.

Assuming no changes in the general price level, population increases alone should result in much greater quantities of tree nuts being demanded.4/ However, if the general price level and personal disposable incomes increase, the per capita consumption of so-called luxury products, including tree nuts, would be expected to rise also.

4/ A possible exception: current almond production approximates the needs projected for 1980.

Table 6.--Population projections and resulting tree nut consumption (shelled basis) by kinds, assuming 1960-62 per capita consumption

Year	Popula-tion	Almonds		Filberts		Pecans		Walnuts		Total	
	Mils.	Lbs.	Mil. lbs.	Lbs.	Mil. lbs.	Lbs.	Mil. lbs.	Lbs.	Mil. lbs.	Lbs.	Mil. lbs.
1965	194.7	.25	48.7	.06	11.7	.35	68.1	.34	66.2	1.0	194.7
1970	209.0	.25	52.2	.06	12.5	.35	73.2	.34	71.1	1.0	209.0
1975	225.9	.25	56.5	.06	13.6	.35	79.1	.34	76.8	1.0	225.9
1980	245.3	.25	61.3	.06	14.7	.35	85.9	.34	83.4	1.0	245.3
1985	266.3	.25	66.6	.06	16.0	.35	93.2	.34	90.5	1.0	266.3

Source: Population data taken from Bureau of the Census: Projections of the Population of the United States, by Age and Sex; 1964 to 1985, With Extensions to 2010. Projection Series B, Series P-25, No. 286, July 1964.

At the present time, the bulk of the tree nuts are consumed in manufactured products such as candy, baked goods, and ice cream. Trends in consumption of these products that incorporate tree nuts are not available, but it is estimated that the consumption of confectionery items has remained about stable at 17 pounds per person 5/ since World War II, and the per capita consumption of baked goods has followed the same general pattern. However, in 1963, per capita consumption of confectionery items rose to 17.7 pounds. Data based on 1947 incomes indicate that as family incomes rise, consumption of confectionery, desserts, and baked goods tends to rise until an average income of $3,000 to $3,999 is reached, at which point family consumption remains about the same or declines slightly. If average family incomes have risen to the point where additional income has no effect on per capita consumption, then any increase in total consumption of tree nuts must come from an increase in population and changes in consumers' tastes.

In the past few years, however, there has been a change in the pattern of foods purchased as well as a change in the forms in which they are purchased. More services are now incorporated in the products offered for sale in retail stores. In keeping with this trend, more tree nuts are now offered for sale shelled for use in the home either for out-of-hand eating or for use in preparation of other foods. The tree nut industry probably lagged behind other food industries in responding to the packaged-convenience trend, partly because of the technical difficulties in keeping the nut kernels fresh and attractive when displayed in retail outlets. Many problems have been overcome, and some increased consumption of nuts can be expected from improved merchandising methods and increased consumer education concerning the use of nuts in main course dishes as well as in desserts and confections. The increased use of almonds in prepared mixes and frozen foods augurs expanding uses of almonds and perhaps the entrance of other tree nuts into these food fields.

5/ U.S. Department of Commerce, Business and Defense Services Administration. Confectionery Sales and Distribution, 1962. May 1963.

Grower Prices

Prices received by farmers for almonds, filberts, pecans, and walnuts are affected by the size of the domestic crop, the general price level, and by supplies of competing tree nuts. Prices of the individual kinds of tree nuts vary relative to each other. During the period 1935-39, the average grower price for almonds was $285 per ton, compared with $240 for filberts, $184 for pecans, and $198 for walnuts. During 1960-63, the average prices had risen to $583 for almonds, $428 for filberts, $514 for pecans, and $482 for walnuts (table 7).

Table 7.--Average grower prices for domestic tree nuts, selected periods and specified years

Year	Average price per ton			
	Almonds	Filberts	Pecans	Walnuts
	Dollars			
1935-39	285	240	184	198
1945-49	503	333	446	442
1950-54	491	333	459	394
1955-59	682	297	542	455
1960	526	420	620	536
1961	561	380	362	467
1962	654	440	704	467
1963 1/	591	470	368	2/460

1/ Preliminary.
2/ California only.

During 1929-40, prices received by farmers for edible tree nuts fluctuated from year to year but followed rather closely the pattern of prices received for all crops 6/ and for peanuts. Prices for tree nuts began to rise in 1940, rose rapidly in 1941 and 1942 and finally, in October 1943, the Office of Price Administration placed all edible tree nuts under price control. Price controls were removed in May 1946, and with the exception of prices for pecans, prices remained below the control levels until 1955. Indexes of prices of almonds, filberts, and walnuts (1957-59 = 100) were below the index of prices received for all crops in every year during the 1946-54 period, while prices

6/ All crops include food grains, hay, cotton, tobacco, oilbearing crops, fruits, commercial vegetables for fresh market, potatoes, sweetpotatoes, and all edible beans.

for pecans were higher than the average for all crops in only 2 years, 1950 and 1954. Prices for domestic tree nuts rose sharply in 1955, seemingly ushering in a prosperous decade for tree nut growers. With the exception of 1957, since 1955 the index of prices for at least one of the domestic tree nuts has been higher than the index of prices for all crops. The index of peanut prices, which are supported by the U.S. Department of Agriculture, has, on the average, not been as favorable as the index of prices for tree nuts. The relatively favorable prices received by tree nut growers since 1955, have undoubtedly encouraged the increased planting of tree nuts.

Wholesale Prices

New York City is the leading market for both domestic and imported tree nuts and the largest port of entry. Limited information concerning wholesale prices for typical grades of tree nuts in New York is available. Some quotations appear in the New York Journal of Commerce and publications of private price-collecting agencies. Although these quotations are incomplete, and, in some instances, may not be the actual prices at which individual shipments of nuts are bought and sold, they do indicate the trend of wholesale prices for domestic nuts. Roughly, the trend of wholesale prices for both shelled an in-shell nuts is comparable to the trend of grower prices.

Average prices for typical sizes and varieties of in-shell tree nuts have tended to move together (table 8). Almonds are usually priced slightly higher than walnuts and pecans. Filberts are usually several cents lower. From year to year, however, prices for each of the tree nuts fluctuate widely, depending on production, carryover stocks, and supplies of competing tree nuts. Average price relationships among the tree nuts might not hold true for specified years.

Prices for shelled tree nuts should be a more important indicator of price trends to the producer since an ever increasing portion of the total nut crop is being marketed in the form of shelled meats. However, such is not the case. Since most of the shelled tree nuts are sold by large sellers to very large buyers, the bulk of the tree nuts do not enter a market for which prices are quoted.

It is a common practice among tree nut suppliers to contact their larger customers early in the season and consummate the sale for the customers' annual supplies of nuts. After the large accounts have been sold and prices determined, price lists are published. After the large suppliers have published their price lists, the smaller suppliers announce their prices, which are usually a cent or two per pound lower for each variety or kernel cut than prices of the industry leaders. In large crop years, however, these published prices mean little, and buyers canvass various sellers to determine where nuts can be purchased at the lowest cost. This often leads to sharp competition among the nut sellers.

In past years, the sharp price competition among tree nut sellers has often resulted in bankruptcy for smaller and less well-financed firms in the pecan industry. Due partially to marketing orders, the other 3 tree nut industries

Table 8.--New York price quotations per pound by primary distributors for specified sizes and varieties of in-shell tree nuts 1/

Period or season beginning October 2/	Pecans, large	Walnuts, first quality, large	Almonds, Neplus or IxL	Filberts, round, large
		Cents		
1935-39	16	18	21	16
1945-49	34	34	33	27
1955-59	40	40	43	32
1960	4/44	3/40.5	3/43	3/31
1961	5/57	3/40.5	3/38	3/27
1962	6/--	3/39	3/38	3/33
1963	6/--	4/39	3/41	3/33

1/ When quotations for grades indicated were not reported, quotations for comparable grades were substituted. The containers were primarily 100-pound bags. Prices for wholesale lots or packs containing cellophane bags about 3 cents higher.

2/ Simple average of October, November, and December prices of years shown.

3/ October prices only.

4/ November and December only.

5/ September only.

6/ Not available.

Source: New York Journal of Commerce: Nut Distributors' price lists, brokers quotations. Series for walnuts are prices of Diamond Walnut Growers, except as noted.

have been more stable. To reduce the speculative nature of tree nut marketing, some firms have recently begun to sell nuts on 18-month or 2-year contracts. This of course necessitates increased storage of nuts from year to year, so that contracts can be protected. While these marketing techniques increase the capital requirements of small operators, they also bring increased price stability to the industry. These techniques have also resulted in increased sales of tree nuts. In the past, large food manufacturers have been hesitant to include tree nut products in their long-range advertising and promotion plans because they were not sure whether sufficient quantities of tree nuts would be available at reasonable prices. The long-term contracts, which guarantee both quantity and price, have restored confidence in tree nuts and have resulted in increased tree nut sales.

COMPETITION

While the consumption of all nuts is expected to increase, consumption of the individual nuts is dependent upon the demand for products in which they

are used and the degree of competition among nuts for these end uses. The competition may be among the kinds of tree nuts or between tree nuts as a group and peanuts.

At the present time, the consumption of tree nuts (shelled basis) is small compared with the consumption of peanuts. During the 1962-63 season, 344 million pounds of peanuts were used by the confectionery and salting trades, compared with less than 60 million pounds of domestic tree nuts. In all uses, nearly 809 million pounds 7/ of peanuts were used, compared with less than 150 million pounds of domestic tree nuts.

In the shelled-nut mixtures, peanuts predominate and tree nuts compete for the remaining share (usually about 30-40 percent) of the mixtures. Cashews comprise about 20 percent of the nuts used by the salting trade, but these are used as substitutes for peanuts in deluxe mixtures rather than as replacements for other tree nuts. More filberts and almonds are used than pecans, or brazil nuts, but the percentage of each varies from year to year depending upon the price of each relative to the others. Walnuts are seldom used in salted-nut mixtures. Typical nut mixtures are shown in table 9. Since the proportion of each kind of nut is not specified on the label of packages of mixed nuts, salters have considerable leeway in varying the proportions of the various nuts used.

Table 9.--Proportions of peanuts and tree nuts used in different shelled salted-nut mixtures

Nut specification	Price of 3½-ounce package	
	29 cents	39 cents
	Percent	
Peanuts		
Extra large Virginia red skins	30	--
Medium blanched Virginia	30	--
Cashews, 320 count	25	55
Almonds, unblanched - 18-20 count	5	25
Filberts, extra large Levante	5	10
Pecans, junior mammoth halves	1	3
Brazil, midget, unblanched	4	7
	100	100

Pricing of shelled-nut mixtures by mixers and salters requires actual use of linear programming techniques, though few salters would classify their calculations by those terms. For any mixture of nuts, the salter has (1) an array

7/ The 809 million pounds of peanuts used excludes the amount used for crushing, but includes 447 million pounds used for peanut butter and peanut butter sandwiches.

of prices he must pay for the various varieties, grades, and sizes of nuts to be included in the mixture, or (2) a specified price for the mixture at the retail level, usually allowing 25-percent markup for the jobber and another 25-percent markup for the retail store. The retail price of the mixture is usually specified to the salter by the chainstore or rack jobber. Retail prices for the mixtures are relatively constant, unless special mixtures are made for advertised retail sales.

The confectionery trade uses more peanuts than all other nuts combined. Of the 209 million pounds of shelled nut meats used by the confectionery trade in 1961-62, over 73 percent were peanuts.8/ Almonds comprised about 15, and pecans about 5 percent. Brazil nuts, cashews, filberts, and walnuts accounted for the remainder.

Peanuts compete with tree nuts to a limited extent in the baking trade, comprising approximately 12 percent of the total nuts used, compared with pecans, 43 percent, and walnuts, 26 percent. Few, if any, peanuts are used in ice cream manufacturing or are sold to households in an unsalted form. Almonds, pecans, and walnuts predominate in these uses in approximately that order.

In some instances, however, there is practically no competition between nuts. For example, a manufacturer of candy bars using the word almond in the trade-name would not use any other nut for this item, and would go to great lengths to obtain a sufficient supply of almonds. If it were impossible to purchase sufficient supplies of the grade or size needed at a satisfactory price on the domestic market, quantities would be imported.

The manufacturer of candy bars in the foregoing example, however, probably also produces walnut candy, pecan candy, and other nut candies. Competition in this sense would depend upon consumers' preference, for example, for almond candy over pecan candy and the manufacturer's cost of producing the 2 products. If almonds are expensive relative to pecans and it is therefore less expensive to produce the pecan candy, the manufacturer might curtail the production of almond candy and produce more of the pecan candy, provided that consumers did not have a strong preference for almond candy as against pecan candy. Manufacturers of mixed chocolates might vary the proportion of nut candies in the mixture as compared with, say, caramels or creams, or they might put in more walnut candy and fewer pecan pieces.

In the in-shell tree nut mixtures there is considerable direct competition between the kinds of tree nuts. If almonds are low priced relative to pecans or filberts, more almonds and fewer pecans and filberts are included in the mixture. If walnuts are expensive relative to other nuts, the percentage of walnuts is decreased and the percentage of the other nuts increased depending on the price of each, relative to the others. Standards for size, quality and quantity of each nut contained in in-shell mixed nut packs have recently been developed. Adoption of these standards should result in more uniformity in mixed-nut packs.

8/ See footnote 5.

A typical in-shell mixture of tree nuts contains 30 percent (by weight) of walnuts, 20 percent each of almonds, filberts, and brazil nuts, and 10 percent of pecans. Large nuts are usually used, but in low-priced mixtures smaller sizes are used. The packer of in-shell nut mixtures usually charges 14-18 percent markup over costs; the retailer usually takes a 25 percent markup.

A recent development in marketing in-shell nuts at the retail level has been a return to an old merchandising method. In this method, tree nuts are displayed side-by-side in bulk bins and all are sold for the same price per pound. It has been found that housewives tend to take a scoopful of each kind, and they usually buy more than if nuts are displayed in 1-pound packages. Some stores have reported sales increases of 1,000 percent over prepackaged sales. Since the high-priced nuts (usually, but not always, pecans) are only slightly underpriced and the lower priced nuts are over-priced, the retailer makes a greater profit per pound and realizes a greatly increased total revenue from in-shell nut sales. The effectiveness of this merchandising method can be nullified, however, if the retailer uses lower grades of the expensive, or high-priced nut.

The dominance of peanuts in those areas where they compete with tree nuts is due to price. Peanuts are much lower-priced than tree nuts. In 1960-63, the season average grower price for peanuts was $211 per ton compared with $583 for almonds, $428 for filberts, $514 for pecans, and $482 for walnuts. Converting these to a shelled basis and disregarding costs of shelling and any value of shells or other byproducts, peanuts cost the primary purchaser 15.1 cents per pound on a shelled basis, compared with 49.2 cents for almonds, 43.2 cents for filberts, 61.7 cents for walnuts, and 69.6 cents for pecans.

Table 10.--Average prices per ton in-shell, pounds of nut meats per ton of in-shell nuts, and value of nut meats per pound of in-shell nuts, 1969-63

Kind	Price per ton in-shell	Pounds of nut meats per ton 1/	Prices of nut meats per pound
	Dollars	Pounds	Cents
Peanuts	211	1,400	15.1
Almonds	583	1,100	53.0
Filberts	428	780	54.9
Pecans	514	780	65.9
Walnuts	482	780	61.8

1/ Conversion factors used: Peanuts, 0.70; almonds, 0.55; filberts, 0.39; pecans, 0.39, walnuts, 0.39.

The present price differential between peanuts and tree nuts is expected to continue. The production of tree nuts is a long-range enterprise in which the bulk of the costs are fixed while the acreage of peanuts is decided on annually, and the costs of production are variable.

To increase the consumption of tree nuts at a rate greater than that expected through normal population growth, the tree nut industry should first enhance the competitive position of tree nuts in those outlets where they already have a competitive advantage, i.e., the baking industry, households (unsalted for home cooking use), and ice cream manufacturers. Effective advertising, product promotion, and merchandising plus research on new products, forms, and uses of tree nuts should help to accomplish this. Secondly, increased use of tree nuts by the confectionery and salting trades should be encouraged through assuring adequate supplies at competitive prices over a period of years.

APPENDIX

List of Tables in Appendix

Table 11.--U.S. tree nuts: Production by States, 1955-59 average, and individual crop years 1960 through 1963

Commodity and area	1955-59	1960	1961	1962	1/ 1963
			-Tons-		
Almonds:					
California	47,400	53,000	66,400	48,000	60,300
Filberts:					
Oregon	7,760	8,400	11,100	7,300	6,600
Washington	420	550	660	480	340
Total	8,180	8,950	11,760	7,780	6,940
Pecans:					
North Carolina	810	1,550	750	950	2,200
South Carolina	2,440	2,150	4,000	200	5,300
Georgia	16,650	18,850	39,300	7,600	56,000
Florida	2,420	900	2,400	1,800	3,400
Alabama	9,370	8,650	25,000	3,500	30,500
Mississippi	5,020	8,900	12,750	3,000	15,000
Arkansas	2,820	5,250	3,050	1,600	5,500
Louisiana	8,960	7,500	18,000	2,250	24,500
Oklahoma	9,530	20,500	5,800	3,800	8,000
Texas	17,880	15,500	10,000	7,000	28,000
New Mexico	2,264	4,000	2,325	3,700	3,000
Total	78,165	93,750	123,375	35,400	181,400
Walnuts:					
California	68,600	70,300	61,200	77,000	79,300
Oregon	4,840	2,500	6,300	2,900	3,800
Total	73,400	72,800	67,500	79,900	83,100
Total all nuts	207,185	228,500	269,035	171,080	331,740

1/ Preliminary.

Source: Crop Reporting Board, Statis. Rptg. Serv., U.S. Dept. Agr.

Table 12.--Imports of in-shell tree nuts, United States, 1929-62

Year beginning October 1	Almonds	Brazils	Chestnuts	Filberts	Pecans 1/	Pignolias 1/	Pistachios	Walnuts	Total
				Tons					
1957-59 Average									
1929	2,393	6,714	8,472	2,233	--	--	513	3,490	23,815
1930	12	13,516	9,364	3,570	--	--	474	1,777	28,713
1931	4	9,124	8,377	2,918	--	--	948	3,012	24,383
1932	73	10,797	13,269	2,835	--	--	1,080	906	28,960
1933	2	3,523	6,473	998	--	--	584	4	11,584
1934	38	10,505	7,341	1,232	--	--	1,195	15	20,326
1935	1,375	11,035	8,055	1,761	--	--	1,459	158	23,843
1936	240	8,966	9,351	1,940	--	--	1,506	37	22,040
1937	1	7,258	10,720	113	--	--	1,163	127	19,382
1938	2	10,488	8,311	323	--	--	904	68	20,096
1939	0	13,971	7,207	644	--	--	1,599	19	23,440
1940	3	11,169	4,445	22	--	--	1,825	0	17,464
1941	1	8,325	1,381	0	--	--	332	0	10,039
1942	0	812	819	0	2/74	0	0	0	1,705
1943	460	0	484	6	66	2	61	0	1,079
1944	201	0	361	36	7	0	930	0	1,535
1945	370	8,717	151	931	16	0	1,108	24	11,317
1946	14	13,240	3,572	1,305	113	0	3,402	118	21,764
1947	10	16,275	9,043	3	85	3/0	2,965	3	28,384
1948	3	10,818	8,887	52	0	4	2,106	34	21,904
1949	3/	6,842	9,748	16	3/	3/	4,922	3	21,531
1950	141	8,121	9,858	0	10	15	3,590	59	21,794
1951	3/	9,438	7,997	100	0	1	3,536	8	21,080
1952	0	10,608	9,023	74	0	18	2,748	53	22,524
1953	0	6,324	7,994	222	19	32	1,913	0	16,504
1954	0	8,356	6,840	0	4	0	4,012	0	19,212
1955	3/	13,011	8,679	0	365	1	2,803	310	25,169
1956	3/	9,587	8,070	526	66	1	4,220	50	22,520
1957	65	9,634	6,040	33	24	1	4,874	24	20,695
1958	308	9,188	9,088	69	161	5	4,552	29	23,400
1959	82	8,017	8,202	19	438	4	6,398	51	23,211
1960	147	11,228	8,139	22	144	1	3,989	36	23,706
1961	38	8,634	6,558	23	6	77	8,673	23	24,032
1962 4/	22	2,361	5/ 6,482	--	136	--	3,931	3	12,935

1/ Pecans and pignolias separated as to shelled and in-shell January 1, 1943; prior to 1943, considered shelled. 2/ January through September only. 3/ Less than 1,000 pounds. 4/ Eight months--October to May. 5/ Four months--October to January.

Source: Bureau of the Census.

Table 13.--Imports of shelled tree nuts, United States, 1929-62 1/

Year beginning October 1	Almonds	Brazils	Cashews	Filberts	Pecans	Pignolias	Pistachios	Walnuts	Total
				-Tons-					
1957-59 Average	3,029	4,608	32,438	3,019	213	239	289	2,006	45,841
1929	9,291	1,671	1,035	2,137	59	237	84	8,424	22,938
1930	6,482	2,479	4,333	2,371	261	233	77	8,163	24,399
1931	3,714	3,351	5,712	1,278	21	179	154	5,463	19,872
1932	2,240	3,132	4,774	1,450	38	168	176	2,780	14,758
1933	1,497	3,597	7,147	1,102	215	150	95	2,775	16,578
1934	1,786	4,562	10,408	1,058	192	176	195	2,705	21,082
1935	5,688	4,903	10,539	1,087	32	179	237	1,825	24,490
1936	5,003	4,065	13,034	1,114	95	213	195	2,706	26,425
1937	1,084	3,258	12,545	1,022	35	169	266	1,998	20,377
1938	778	4,568	15,672	777	81	163	156	2,202	24,397
1939	611	5,940	12,654	1,474	144	151	263	2,172	23,409
1940	1,416	8,111	17,839	418	4	68	209	2,320	30,385
1941	1,429	5,090	12,642	19	0	0	23	946	20,149
1942	579	229	2,770	27	82	29	0	62	3,778
1943	8,410	0	5,380	607	80	149	11	6	14,643
1944	9,645	0	12,171	4,798	159	130	93	6	27,002
1945	9,357	4,315	13,368	4,189	71	124	67	239	31,730
1946	3,031	3,218	15,502	4,876	196	141	106	469	27,539
1947	6,242	2,927	15,931	2,710	149	143	71	271	28,444
1948	4,699	3,371	18,212	3,651	14	114	112	1,439	31,612
1949	809	3,877	22,117	3,134	178	147	146	3,102	33,510
1950	6,558	2,868	27,272	2,158	326	142	220	3,750	43,294
1951	2,005	2,944	20,777	4,032	181	125	417	3,184	33,665
1952	2,761	3,369	23,179	2,135	110	151	102	3,578	35,385
1953	3,321	2,405	25,609	2,623	148	173	133	3,752	38,164
1954	780	3,210	34,460	3,967	184	210	145	3,866	46,822
1955	111	4,694	30,377	2,761	243	219	134	6,075	44,614
1956	22	4,592	26,214	3,110	147	194	173	1,626	36,078
1957	2,404	5,414	33,803	2,228	205	238	299	1,558	46,149
1958	6,245	4,475	32,099	3,571	196	213	391	1,655	48,845
1959	438	3,934	31,411	3,258	238	266	177	2,806	42,528
1960	288	5,206	30,942	2,414	222	237	216	3,817	43,342
1961	174	6,085	30,551	1,308	144	231	411	1,369	40,273
1962 2/	63	3,899	23,629	1,304	361	180	48	1,695	31,179

1/ All imports by countries prior to 1934 were general imports. Beginning 1934 all imports by countries are imports for consumption. 2/ Eight months--October to May.

Source: Bureau of the Census.

Table 14.--Exports of in-shell and shelled tree nuts, United States, 1940-62

Year beginning October 1	In-shell 1/					Shelled 1/				
	Almonds	Filberts	Pecans	Walnuts	Total	Almonds	Filberts	Pecans	Walnuts	Total
	-Tons-									
1940	2/	2/	102	1,422	1,524	2/	2/	3/93	3/22	115
1941	2/	2/	26	1,208	1,234	2/	2/	16	81	97
1942	3/38	3/12	8	182	240	0	0	8	36	44
1943	80	222	1,394	1,216	2,912	0	0	281	13	294
1944	173	254	616	1,805	2,848	0	0	272	69	341
1945	160	146	1,239	3,327	4,872	0	0	474	135	609
1946	540	331	232	2,492	3,595	0	0	96	114	210
1947	143	425	102	1,769	2,439	0	0	217	428	645
1948	113	194	313	1,320	1,940	0	0	586	172	758
1949	225	239	83	1,659	2,206	0	0	332	24	356
1950	88	338	135	1,642	2,203	0	0	292	30	322
1951	148	346	347	1,521	2,362	4/509	3/5	326	35	361
1952	345	482	355	1,837	3,019	1,992	5	370	42	412
1953	341	222	273	1,553	2,389	3,986	10	467	56	4,519
1954	359	934	175	4,664	6,132	2,417	6	293	61	2,777
1955	208	513	215	1,686	2,622	4,459	22	373	83	4,937
1956	642	249	187	1,993	3,071	7,641	5	444	37	8,127
1957	510	975	228	4,748	6,461	1,697	14	473	53	2,237
1958	152	701	253	2,321	3,427	2,052	3	450	543	3,048
1959	920	241	168	978	2,307	8,814	22	431	84	9,351
1960	574	130	315	1,147	2,166	4,410	39	574	97	5,120
1961	236	417	525	1,012	2,190	6,178	70	659	103	7,010
1962 5/	133	259	164	882	1,438	2,709	69	339	93	3,210

1/ Separated into in-shell and shelled as follows: Pecans and walnuts, January 1, 1941, (considered to be in-shell prior to that date); Almonds, January 1, 1952, (considered in-shell through November 1951, shelled in December of 1951); Filberts, January 1, 1952, (considered to be in-shell prior to that date).
2/ Not available.
3/ January to September only.
4/ December to September only.
5/ October to May only.

Source: Bureau of the Census.

Table 15.--Estimated sales of shelled tree nuts through various outlets, by kinds, United States, 1962-63 1/

Outlet	Total	Almonds	Filberts	Pecans	Walnuts	Cashews	Brazils
	Million pounds						
Grocery wholesalers	15	2	2/	5	8	--	--
Chainstores or retailers	20	4	2/	7	9	--	--
Mixers or salters	13	8	2	3	2/	63.9	0.07
Confectioners	41	26	2/	12	3	4.3	0.07
Bakers or bakery supply	33	6	2/	23	4	4.3	0.01
Ice cream manufacturers	10	5	2/	4	1	--	--
Gift packers	1	2/	2/	1	--	--	--
Exports	5	5	2/	--	--	--	--
Repackers	5	--	--	3	2	--	--
Other	3	--	--	2	1	--	--
Total	146	56	2	60	28	72.5	0.15
	Percent						
Grocery wholesalers	10	4	12	9	29	--	--
Chainstores or retailers	14	7	7	11	30	--	--
Mixers or salters	9	15	63	6	2	88	46.5
Confectioners	28	48	4	20	10	6	46.5
Bakers or bakery supply	23	10	12	38	14	6	7.0
Ice cream manufacturers	7	8	3/	7	5	--	--
Gift packers	1	3/	3/	1	--	--	--
Exports	3	3/	2	--	--	--	--
Repackers	3	--	--	4	8	--	--
Other	2	8	3/	4	2	--	--
Total	100	100	100	100	100	100	100

1/ Figures for pecans are for 1960-61. 2/ Less than 1 million pounds. 3/ Less than 1 percent.